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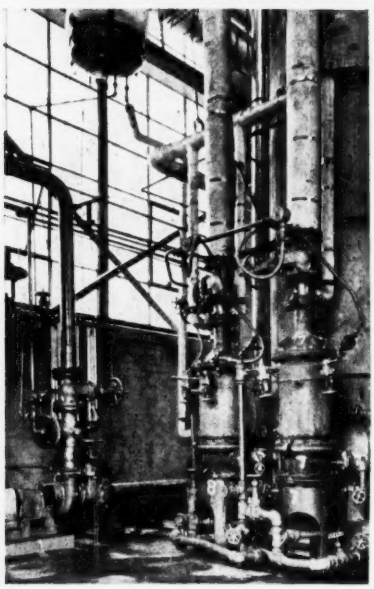

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Continuous DDT process boosts output thirty-fold; bonus: cuts plant cost ..... p. 29

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Formaldehyde: a buyers' market now, likely a sellers' market next year; here's why ..... p. 48

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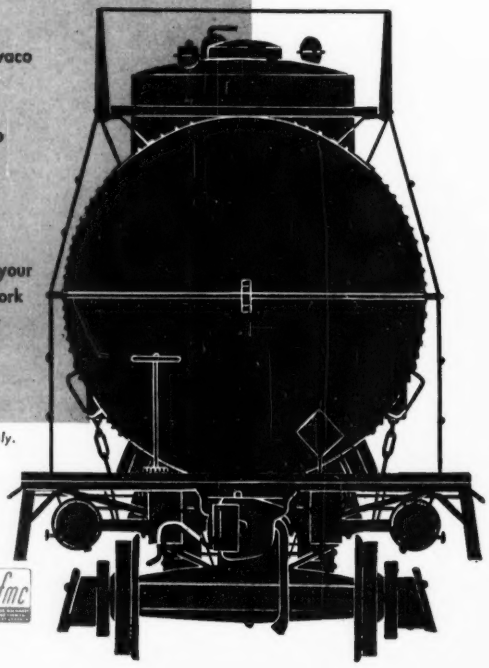

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Chemical Week

Volume 69 Number 22

December 1, 1951

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CONSULTING EDITORS: Lawrence W. Bass, Benjamin T. Brooks, John V. N. Dorr, Charles R. Downs, Ernest W. Reid, Norman A. Shepard, Roland P. Soule, Robert L. Taylor.
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Chemical Week (including Chemical Specialties, and Chemical Industries) is published weekly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. **Publication Office: 1309 Noble St., Philadelphia 23, Pa.**

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 18, N. Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Division; Ralph B. Smith, Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.

Subscriptions to Chemical Week are solicited in the chemical and process industries only from management men responsible for corporate affairs, purchasing, sales, marketing, packaging, research or chemical functions. Position and company connection must be indicated on subscription order. Address all subscription communications to J. E. Blackburn, Jr., Director of Circulation. Allow ten days for change of address.

Single copies 35¢. Subscription rates—United States and Possessions $5.00 a year; $8.00 for two years; $10.00 for three years. Canada $6.00 a year; $10.00 for two years; $12.00 for three years. Pan American countries $15.00 a year; $25.00 for two years; $30.00 for three years. All other countries $25.00 a year; $40.00 for two years; $50.00 for three years. Entered as second class matter April 5, 1951, at the Post Office at Philadelphia 23, Pa., under the Act of March 3, 1879. Printed in U.S.A. Copyright 1951 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved.

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OPINION . . . . . .

Synergizing Research

To THE EDITOR: There was much meat in your editorial, "The Coming Squeeze," (Nov. 17) and the subject matter certainly is very timely.

I'd like to add one thing to your recommendation that producers ". . . invest in research to develop new, longer profit items." When some of that investment is made in the services of the independent consulting laboratories, the return on the investment is frequently enhanced particularly because of the objectivity and more diverse experience they apply to current operations, processes and products.

A new viewpoint brought to bear on a manufacturing operation will often visualize and reveal uses and markets for end products that have not, and perhaps would not, otherwise be considered. The value of the independent laboratory in charting uses for entirely new products is, of course, well recognized.

The matter of time-saving is certainly one that is of great importance today, and because of the new viewpoint and the varied experience that is gotten from the independent laboratory, research goals are usually reached in a much shorter time when a company research division is complemented by the outside laboratory.

It would appear that your advice as to research will be followed since, as you may remember, in the Evans Fourth Annual Survey, 65% of the respondents indicated that their total research budgets for 1951 would be increased over 1950.

S. F. CONEYBEAR
Vice President &
Development Manager
Evans Research & Development Corp.
New York, N. Y.

Allethrin Inventor

To THE EDITOR: We are indeed grateful to you for the attention you have been giving to allethrin and to the U.S. Department of Agriculture where it was developed. However, I would like to respectfully call your attention to the fact that I am a co-inventor of allethrin with Dr. F. B. LaForge.

We would therefore appreciate mention of this fact in future articles relating to allethrin. Mr. N. Green was also part of our group engaged in this development and his name appears on a number of our chemical publications concerned with allethrin.

I am calling this matter to your attention because of an article concerning allethrin "Sprouting Allethrin" (Aug. 11), in which a subtitle under a picture of Dr. LaForge reads as follows:

"USDA's LaForge: His allethrin a million dollar baby now."

In the text of the article describing the development of allethrin is a sentence which reads as follows:

"Carbide, which achieved commercial production about a year after a U.S. Department of Agriculture team headed by F. B. LaForge reported its synthesis of the pyrethrum-like chemical, has probably turned out more of the material than anyone else, would be the biggest factor in the business if it puts in the new plant."

It may be of interest to you to know that the first of the Department of Agriculture's patents relating to allethrin has been allowed and is being issued as of November 13, 1951, patent number 2,574,500, "Hydroxydiketones" by Milton S. Schechter and Frederick B. LaForge.

MILTON S. SCHECHTER
Chemist,
Insecticide Investigations
U.S. Dept. of Agriculture
Beltsville, Md.

Right, Reader Schechter. CW lapsed in a picture caption and a phrasing. We did, however, cite scientists LaForge, Schechter and Green in an earlier article ("Prop for Allethrin," Jan. 27) which detailed the research development rather than the commercialization stressed in our more recent news story.—ED.

Can't Eat and Have

To THE EDITOR: Without any desire to detract from the importance of the current research on the treatment of wool with beta propiolactone described in your news article in the November 10th issue . . . I must take issue with one statement which appeared in that presentation.

You mentioned certain changes in the behavior of the treated wool "at no sacrifice in quality." I believe that this is a rather sweeping statement.

Changes in properties of wool such as its felting speed, softness, absorption rate, and dye affinity, may be an advantage in some uses and a disadvantage in others. Increased softness, for example, might give a more luxurious hand but it might be definitely undesirable in some of the common wool uses. Reduced affinity for water is of value in some cases and a detriment in others.

It would seem to me that it would be more reasonable to regard this modification in the same light as

The chemical industry knows the Isco brand of Caustic Potash, Carbonate of Potash and other related products through successful performance in many processes. Over the years, Isco chemicals—produced in a variety of grades to meet every requirement—have proven dependable and uniform.

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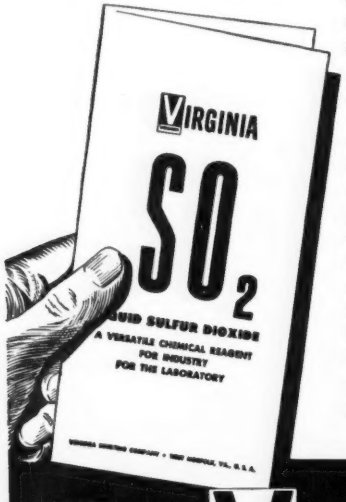

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VIRGINIA Chemicals

OPINION . . . . . .

other types of alteration, a useful tool to form new patterns of fiber properties of value in limited cases. As presented, it would seem to expand this valuable research into a false idea of having your cake and eating it too.

It also occurs to me that you have played down the most important phase of this investigation; that is, studies of modifications made possible with propiolactone will have valuable information about the structure of the fiber itself and the relationships between its chemical structure and physical properties.

GILES E. HOPKINS
Technical Director
The Wool Bureau, Inc.
New York, N. Y.

TO THE EDITOR: We read the article concerning the modification of wool fiber with β-propiolactone (Nov. 10) with great interest . . . felt that you handled the subject exceptionally well. There were, however, two statements which might be misleading . . . should be clarified.

First, you state that "β-propiolactone penetrates the fiber, increases its diameter and density . . .". In reality the increase in diameter (bulk) is accompanied by a reduction in density as might be expected since the specific gravity of wool is approximately 1.34 and that of β-propiolactone approximately 1.15.

Second, you state that treated ". . . fibers have better split resistance and higher tensile strength". This statement applies to felts prepared from treated fibers—not fibers as such. The breaking force for individual fibers is only slightly changed and since the fiber diameter has been increased, the breaking force per unit area (tensile strength) has obviously been reduced.

CHEMICAL WEEK is to be congratulated again on doing a grand job of factual reporting and objective writing.

R. P. KENNEY
Manager
Chemical Sales
B. F. Goodrich Chemical Co.
Cleveland, Ohio

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NEWSLETTER

Statistics are the foundation on which plans are made and plants are built; hence any additional grist for the market researcher's mill is good news for chemical planners.

Fatty acid figures are now being compiled monthly by the Association of American Soap & Glycerine Producers. Production and sales totals for eleven categories of fatty acids are included.

First month's totals (for October) show output of 18,386,000 pounds of stearic and other saturated acids; 20,193,000 pounds of oleic and other unsaturates; shipments of 15,285,000 and 17,232,000 pounds.

A figure of another kind also has chemical men talking: the $47,745,000 certificate of necessity (at 50%) granted to American Cyanamid Co. for "nitrogen facilities along the Gulf Coast."

At the same time a representative of Chemical Construction Co., Cyanamid subsidiary, was reportedly buying equipment in Houston for a multimillion dollar acrylonitrile plant in the New Orleans area—which sounds like the one for which rapid amortization was granted.

The location, together with Chemico's doing the construction, points to acetylene as the acrylonitrile raw material.

Another certificate granted last week shows that antibiotic expansion, huge though it has been, still isn't enough.

Eli Lilly received a 50% write-off for a penicillin plant at Lafayette, Ind. The amount is undetermined, but Lilly asked for $19 million.

The first "suggestion award" made by the Atomic Energy Commission's compensation board put $7,500 in Cyril E. McClellan's pocket. Five claims were previously considered under provisions of the 1946 Atomic Energy Act, but were all turned down.

McClellan, an engineer at Westinghouse's Towson, Md., plant, developed a method and apparatus for separating isotopes. A similar method had been tried and abandoned by AEC.

The $7,500 figure is arbitrary, bears no relation to McClellan's estimate of the proposal's worth. AEC guessed how much work and expense went into it, added enough to make it worthwhile.

Makers of cosmetic ingredients and formulations should keep an eye on the Delaney Committee hearings in California for straws in the wind that portend the direction of future legislation.

First testimony on cosmetics came from two dermatologists, one (H. V. Allington) practicing, the other (Ervin H. Epstein) a Stanford professor. Both expressed the view that new cosmetic ingredients are inadequately tested for skin irritation.

Allington recommended a law to require skin patch tests before marketing. He came out for a minimum of 200 tests, rejecting the material if more than one positive reaction consistently appears.

Epstein was even more severe, asking 500 monthly tests for six months—with 99.9% negative reactions—and six months' constant use by volunteers before a new product is marketed.

He would also ban certain chemicals that are irritants or sensitizers, and would welcome compulsory labeling as to ingredients.

Is defense research effort being wastefully duplicated? With annual budgets running into the billions, the danger is real.

Actually, the military services have done a good job of coördinating, and if duplication should arise, Congress will be the chief culprit. That's because Congress makes independent appropriations (as in the Public Works Bill) uncoördinated projects.

Another factor: If the Government research agencies try to maintain their emergency-expanded staffs and facilities on a permanent basis, it will be difficult to prevent duplication.

The AEC farms out its projects, isn't so subject to the temptations of a growing scientific bureaucracy as the Air Force, for example, which is building its own huge research installations.

The National Fertilizer Association is now carrying the ball tossed to it by Secretary of Agriculture Brannan when he predicted an inadequate fertilizer supply next season (CW Newsletter, Nov. 17).

The Association is urging farmers to buy now and store until needed. It's also giving tips on how to store it safely.

While nitrogen and potash output will each be up about 5%, priority sulfur demands may cut superphosphate production by 10%.

Another Agricultural commodity, DDT, was the subject last week of a clarifying statement by the Illinois Department of Public Health.

Because farmers were warned a couple of years ago not to use DDT on cows, in dairy barns, or on feed or forage for dairy cattle, many of them were frightened off from using it at all.

Now state officials have made it clear that DDT can—and should—be used for insect control where it is the best insecticide.

Higher prices and defense spending have combined to rocket the rubber industry's sales—and perhaps profits—to the stratosphere.

Sales of the "big five"—Goodyear, Firestone, U.S. Rubber, Goodrich and General (in that order)—may hit $3½ billion this year—up 20% from 1950. Goodyear's sales alone may top a billion.

Chemical firms selling to more than one military service or nonmilitary Government agency will have an easier time if current efforts to standardize specifications, packing and packaging requirements bear fruit.

The Munitions Board, General Services Administration and Bureau of the Budget last week "agreed to agree" in a cooperative development covering common items of supply.

Industry goes along: There's no reason why an item should be packed differently for the Army than for the Navy.

Latest news among the chemical companies: Genessee Research Corp. will manufacture the active ingredient for Shell's VPI (vapor-phase inhibitor) . . . Catalin Corp. will make polystyrene, based on Monsanto's monomer . . . Cheaper mink coats, and more of them, may be the happy result of Lederle Laboratories' new mink distemper vaccine . . . Du Pont is building a commercial-scale methionine plant at Pennsgrove, N.J.

. . . The Editors

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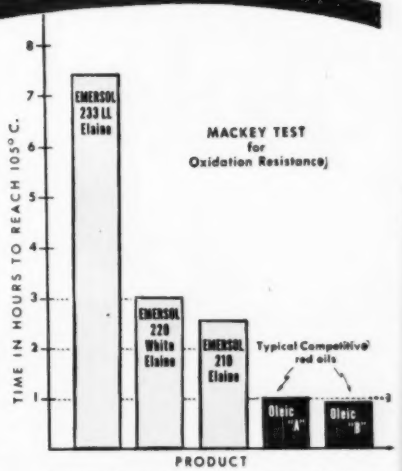

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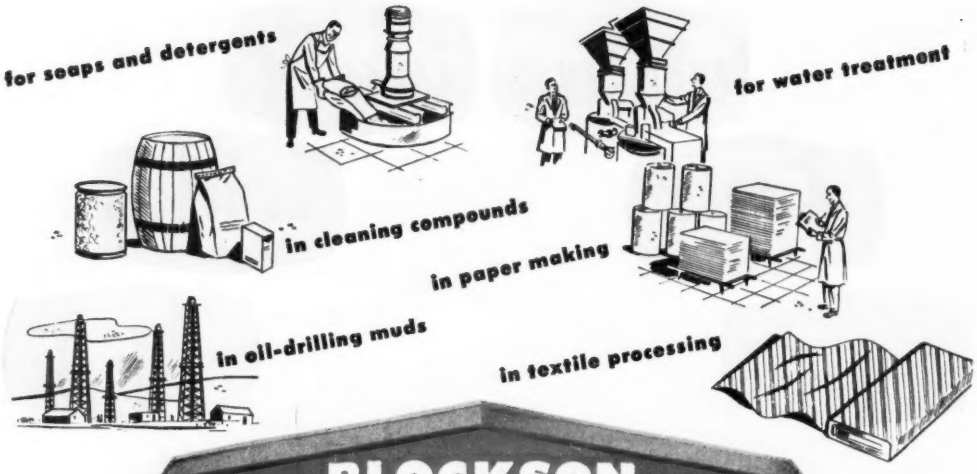

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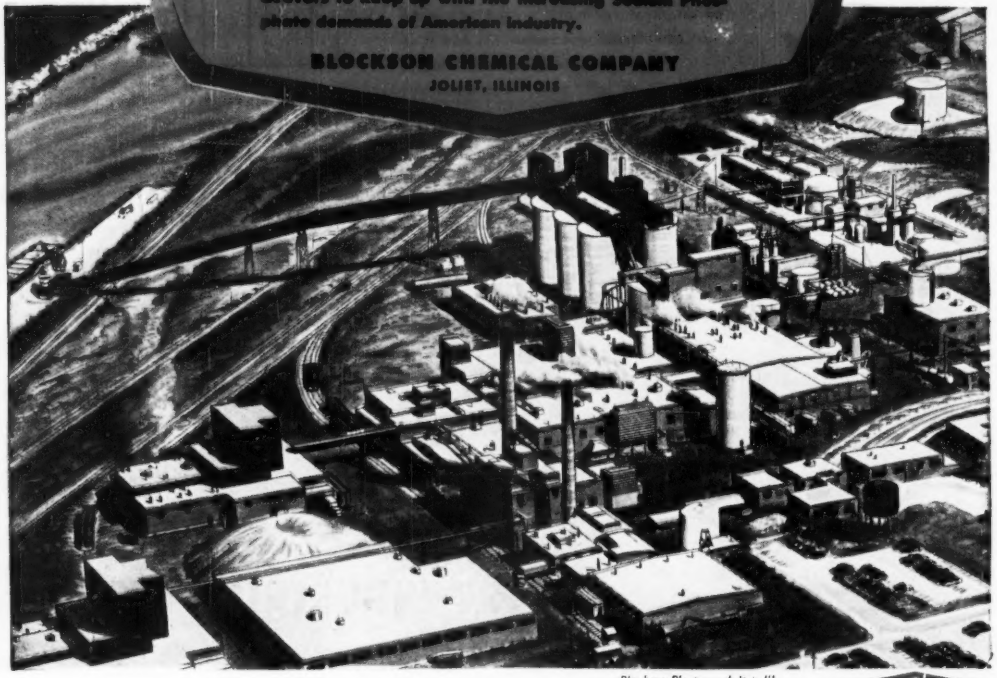

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December 1, 1951 • Volume 69 • Number 22

Chemical Week

BUSINESS & INDUSTRY . . . . .

Too Much Competition

What harries chemical executives most as the new year approaches? CW's editors this week set out to learn, interviewed leaders from coast to coast, came up with these answers.

Federal taxes, materials and manpower shortages, booming costs and relatively fixed prices are furrowing executives' brows.

With old yardsticks gone, expansion programs are more of a gamble, and higher break-even points upset the odds further.

The chemical plant operator who shakes his head at the I'm-worth-plenty attitude of fresh-out-of-school co-workers, takes his tax-slimmed pay envelope home to his wife, and whistles as she orders a $1.15-a-pound roast, has basically the same problems as his boss. Only his boss has him to worry about too.

What troubles both of them most are taxes, rising costs and scarcity of materials, and the lack of young men with the proper training and proper approach to a job.

One executive put it this way this week: "The trouble with us is too much competition. The Government is competing with our stockholders for our profits. Rival companies are competing with us for structural steel, pipes, valves, sulfur. War-baby industries are competing with us for labor and technical men.

"It may be out of date, but we love competition. But not this kind. For we don't have enough to say about the rules, don't always know what they are today, would have to be a Houdini to know what they will be tomorrow."

The Old Inevitable: Taxes are the number one headache of most of the big brass, and one that threatens the chemical industry's reputation as the leading spawning ground of new products. Under today's huge tax impost, a product that would ordinarily sell for 50 cents a pound, for example, may have to be priced at double that figure. And, since the would-be maker knows there's no market for it at near a dollar, it remains in the development department's inactive file.

Where a product is on the market, sales may increase, but it is almost impossible for them to outdistance taxes. One company points to a more than doubling of sales, but shows a lower net as taxes trebled during the same period. Even when a company can maintain shareholders' earnings at a given level, management is likely to hear that equal profits in today's dollars are but ghosts of their former selves.

Chemical companies, being growth businesses, are at a particular disadvantage in calculating excess profits. In most cases, their profits during the base period are completely out of line with expectations from today's expanded capacity, and they are thus penalized for their foresight and economic enterprise. Larger companies can weather the blow more easily than little fellows who can't retain enough of what they make for expansion, and see dim propects for further growth.

Some executives, however, refuse to let taxes disturb their sleep, label them "inevitable" and tussle with manpower and materials problems. Not only is there a shortage of technically trained men and young executives, but those that are available all want to start at the top, salary-wise, and they show little inclination to shoulder responsibilities.

This observation is echoed throughout the industry, and one civic-industry leader thinks that the country's biggest problem is the "trend toward lack of desire to do an honest job." Beginning chemists and engineers take a lot of selling to be convinced that they have a better future in the chemical industry than in a high-salaried, but temporary defense job.

But personnel problems aren't confined to the technical level. In some areas, high-wage defense plants are draining the labor reservoir. One company, for example, would like to go on a 24-hour day, 6-day week basis, but can't get the type of men needed to add the shifts. Operators for new plants are not always available, as is clearly indicated by the situation in one area where there are unfilled openings for 1,000 operators.

It works the other way too: Another manufacturer whose business is off 40% because a big market has fallen casualty, temporarily at least, to defense allocations, doesn't dare fire or furlough men for fear he won't be able to get them back again. He has cut production, and put the men on non-productive jobs.

Nothing Certain: While such a solution is expensive, it is a solution. Trying to get raw materials for existing facilities, construction materials for new units, odd pieces of equipment, steel drums, etc. is another story.

Government approvals for steel are still considered "hunting licenses only." When a company is able to flush and drop enough birds to keep close to a construction schedule, it often finds itself held up by lack of small items such as valves, stainless fittings, etc. And there's always more scrounging for raw materials—sulfur is the most-wanted commodity—to feed the new facilities.

But booming construction costs—as well as taxes—are slowing down expansion plans. One executive says his company spends more time filling out forms for new projects than in designing them. He complains that cost estimates may be out of line within six months "when supposed price and wage controls allow increases after you've made your estimate." More than one company has shelved all active projects for the present.

For the executive—like everyone else—is having many of the basic decisions made for him in Washington, and in Moscow.

Foundation Revives

The National Science Foundation, all but killed a few months ago *(CW, Sept. 8)*, is back on its feet—but still limping. A new appropriation of $3½ million, included in the Supplementary Appropriation Act of 1952 recently signed by the President, is considerably above the earlier grant of $300,000, still far below the requested $14 million.

Nevertheless, the amount is sufficient for the foundation to begin work on its two major operating programs —support of basic research in the sciences and training of scientific man-

power—but on a sharply reduced scale. The research program will get $1½ million of the funds, the training program $1,350,000.

Basic scientific research will be supported by means of research grants. None has been made to date, but many proposals have been received and are being considered.

Stock Option Rulings

The Salary Stabilization Board has now taken the wraps off its regulations for stock option plans. General Salary Stabilization Regulation No. 4, based mainly on the recommendations of a special panel headed by Dean Wesley A. Sturges of the Yale Law School, was released last week. The panel studied about 165 plans, and on the basis of its findings the SSB has made the following general rules:

- A stock option plan is OK if the option price is at least 95% of market value. It will not be considered a salary increase provided there is a corporate statement that the option is granted as an incentive and to encourage stock ownership, and provided that the stock is held two years—considered evidence that the option plan is not increased compensation. There is no provision for enforcement of the two-year rule, but the Defense Act penalizes employers who give, and employees who receive, unauthorized compensation
- If the option price is less than 95% of market value, SSB approval must be obtained. This is considered a salary boost and will be charged against allowed increases under present SSB regulations.
- Stock purchase plans will, for the time being, be treated like stock options. The regulation does not apply to plans under which the right to purchase stock was granted prior to the Jan. 25 "freeze."

SSB regulations apply to salaried workers only, but the Wage Stabilization Board will also be guided by them.

SSB sees little chance for problems in 95% plans, but anything below that —and most are 85%—may cause considerable difficulty. Employers argued at the hearings that stock options were non-inflationary, but SSB demurred.

No Way Out

You can't get out of complying with the Taft-Hartley Law even if your plant and materials are owned by the Government, and your product is sold strictly to the Government. That's the nub of last week's ruling by the National Labor Relations Board against the Great Southern Chemical Corp. NLRB turned down the company's request for dismissal of a petition by the Oil Workers International Union (CIO) asking for an election at the company's Corpus Christi, Tex., plant. The board then ordered the election to determine whether the employees at the plant wished to be represented by the Oil Workers or by the union (Great Southern Chemical Corp. Employees Independent Union) now recognized by the company.

No Exemption: In making the ruling, NLRB rejected the company's claim that it was exempt, as a Government agent, that it is not an "employer," and that it is not in interstate commerce. The company, which leases the plant from the Reconstruction Finance Corp., is a Government contractor subject to Taft-Hartley, the board ruled. The fact that the plant processes normal butane supplied by the Office of Rubber Reserve into butylene for Government use doesn't make the plant exempt from the law.

In rejecting the company's claim to not being an "employer" at the Corpus Christi plant, the board ruled that even though RFC determines operational policies, the company is an employer since it controls hiring and firing, and had already admitted as much by recognizing the local union.

The board also upheld an earlier ruling that Government title to material doesn't exempt a Government contractor from the law.

Louisiana Double

Kaiser Alumium & Chemical Co. will spend $100 million to double the capacity (100,000 tons per year) of its Chalmette, La., reduction works.

This expansion has been made possible by a five-year contract with the General Services Administration (GSA). Under the contract, subject to completion of suitable financing, probably from private, outside sources—GSA will buy up to 100% of the output of the plant.

Four pot lines will be added to the four that are now nearing completion at Chalmette. The $100 million is also expected to pay for:

- Additional power facilities at the Kaiser-owned electrical generating plant at New Orleans. Output will be increased to 478,200 kilowatts, with natural gas as the fuel.
- The Kaiser-owned alumina plant at Baton Rouge will be expanded by 60% to produce up to 800,000 tons per year of alumina from bauxite.
- Additional bauxite-mining equipment is to be sent to Kaiser's deposits that are just now being opened up in the Caribbean, on the British island of Jamaica.

The capacity increase at New Orleans will bring the company's total capacity up to 395,000 tons of primary aluminum per year.

Gel Keeps it Dry

WHEN LE SABRE, General Motors' experimental car was shipped to Europe recently, it was encased in an aluminum-covered plywood sheath. Protection against moisture was provided by 60 lbs. of a silica gel desiccant. On land, the aluminum sheath can double as a mobile garage.

MANLY FLEISCHMANN: In the middle between logic and politics.

JESS LARSEN: His aye is a hot potato.

DREW PEARSON: His nay added heat.

Aluminum: Political Pawn

Still awaiting decision is the suggestion of DMPA's Jess Larsen that Anaconda Copper Co. be brought in as the "rich partner" of Harvey Machine Co. to expedite the latter's long-disputed proposal to establish an aluminum reduction plant at Kalispell, Mont.

As yet, Harvey's position in the final project has not been defined. But if Anaconda puts up the money, the answer seems obvious. Harvey will undoubtedly be relegated to the role of "junior partner."

A go-ahead signal from Manly Fleischmann, NPA and DPA administrator, will mark the completion of the second round of aluminum expansions since the beginning of the Korean War. A "no" will toss the question back into the Washington political cauldron from which the proposal originally bubbled out.

Politics—Not Logic: However logical Anaconda's movement into primary aluminum production might be, the suggestion has evoked a storm of criticism and much political tub-thumping for the "small businessman."

Not to be forgotten in this storm is the stand taken by Columnist Drew Pearson, who has been given credit in many quarters for stopping Harvey's original proposal. Despite the fact that Anaconda's entry into the aluminum picture would inject a fourth financially strong party into the present triumvirate, (Alcoa, Reynolds and Kaiser) Pearson cries "monopoly," and piously talks of protecting the nation from big business. But any company that goes into aluminum is automatically big business: The Kalispell project will cost at least $50 million.

A quick onceover evokes the question: Why should a copper company be interested in getting into the aluminum business? The answer is simple. It is to hedge the competitive position of the company in the event that the present shortage of copper continues. Then the question of a substitute will cease to be academic; search for a replacement will be on with a vengeance.

Aluminum has properties that will enable it to replace copper in practically all major uses. Even today many of the cross-country electrical cables are made of aluminum rather than copper. And aluminum can replace copper for this purpose in all locations except where volume is a major factor; e. g., windings for electrical motors. Either aluminum or plastic (probably polyethylene for cold water lines) can replace copper tubing in domestic plumbing.

Aluminum is not usable under many corrosive conditions where copper alloys are now employed, or for certain high-temperature applications. But the bulk of copper is used for electrical purposes, and substitution here will enable the world's copper mines to provide enough of the red metal for years to come.

Most recent switch from copper to aluminum is General Electric's change from brass to aluminum for the metal base of incandescent light bulbs when NPA ruled that aluminum is less critical than copper.

Logic for a Change: The cold logic and the exigencies of the situation that lie behind the proposal for Anaconda to enter the field of aluminum production will, for a change, probably outweigh politics. Whether or not Anaconda makes it this time, eventual entry of one or more of the copper companies into aluminum manufacture is a must as their hedge against possible loss of future business.

MORNING AFTER: Legal smoke still drifts over Monsanto's Texas City plant.

Texas City Aftermath

On Dec. 7 the six judges of the U.S. 5th Circuit Court of Appeals will sit en banc to hear arguments in the Government's appeal of District Judge Thomas M. Kennerly's ruling that it is liable for $240 million in claims growing out of the Texas City disaster of April 16, 1947.

One of the largest of the 273 suits involved is that of Monsanto Chemical Co. Monsanto asked $50 million in damages for the destruction of its Texas City styrene plant, expenses incurred and loss of profits resulting from the plant's destruction, and for the loss of services of the technically trained and operating personnel who were killed in the disaster.

Monsanto and the other plaintiffs charged extreme negligence by the Government in manufacturing, packing, shipping, and loading the ammonium nitrate fertilizer. The Government denied responsibility; claiming, among other things, that the disaster was an "unavoidable accident." So far, say court officials, the records in the case are the most voluminous in the history of the court. The district court proceedings fill 36 printed volumes.

Shocking: In his general summary of findings of fact, Judge Kennerly stated, "From the beginning of its manufacture on down to and after the day of the Texas City disaster, it [the Government] discloses such disregard of and lack of care for the safety of the public and of persons handling, transporting, and using such fertilizer as to shock one."

In essence the Judge found that:

- The fire, and resultant explosion, started in the ammonium nitrate fertilizer by spontaneous combustion.
- The fertilizer was manufactured, packaged, shipped, and loaded by the Government in full knowledge that it was a dangerous explosive, and with no warning to the public or those handling it.
- The Government knew the dangerous nature of the fertilizer, had made investigations that showed this to be the case, but had negligently stopped short of learning all the facts. What it did learn, however, was sufficient to give it knowledge of the dangers involved.
- The method of packaging (coating the fertilizer granules with wax and packing in asphalt paper bags) greatly increased the dangers involved; and the Government knew this.
- Government negligence reached its peak in permitting such a dangerous material to be loaded in a crowded city in close proximity to chemical plants, with no warning to the inhabitants or handlers of the dangerous nature of the material.
- The Government was, in fact, the owner of the fertilizer.
- The Coast Guard was negligent in not supervising the handling of such dangerous material, and in making no effort to discover the presence of the fertilizer in Texas City.

Very Effective: In the course of his decision castigating the Government, Judge Kennerly wryly observed in answer to the Government's claim that the fertilizer was not "defective" in any way, "As a high-powered and dangerous explosive, the fertilizer certainly was not defective. It practically wiped out Texas City. As a fertilizer it was defective in that it was dangerous."

The Government's appeal is based on the contention that the Judge's ruling was erroneous, that he did not apply the law properly, that the burden of advising the subsequent handlers of the ammonium nitrate about its hazards was not on the Government since the handlers already had such knowledge, and that "serious errors permeated not only the pre-trial and trial stages, but also steps taken by the District Court after the trial."

Plasma Problem

A strike was narrowly averted last week at Sharp & Dohme's Philadelphia plants, where one-third of the nation's blood plasma is processed. A 16-hour continuous bargaining session succeeded in solving the single issue remaining—a union shop—without the necessity of threatened Government action.

The members of the company local of the CIO's Gas, Coke & Chemical Workers had voted to strike over the union shop issue, despite strong pressure to desist from national leaders of the union. Martin Wagner, president of the union, reluctantly authorized the strike when the local's rank and file "almost threw out" their local committeemen for suggesting they accept a contract without the union shop clause.

Government Moves In: The Government considered the danger to the flow of plasma so serious that action would have had to be taken if the strike actually took place. A meeting was called in Washington, and after the 16-hour session, Clyde Mills, assistant director of the Federal Mediation and Conciliation Service, announced that an agreement had been reached, averting the strike.

Although the danger to the flow of plasma was not immediate, the threat was serious enough for the Armed Forces Medical Policy Council to order its Eastern military centers to discontinue or curtail the collection of blood.

Result of the bargaining was a modified union shop clause stipulating that all employees hired on or before Nov. 21 must join the union within 30 days and must continue to be members during the term of the next contract.

The company and the union had already agreed on a 4.4% wage increase, a wage reopening clause after 6 months, automatic increases for promotion, and a maintenance-of-membership clause.

NPA
Manly Fleischmann, Administrator

CHEMICAL, RUBBER & FOREST PRODUCTS BUREAU
Kenneth H. Klipstein, Chief; Lawrence W. Strattner, Assistant

CONTAINERS & PACKAGING DIVISION
Charles Lewis

RUBBER DIVISION
L. E. Spencer

CHEMICAL DIVISION
Osgood V. Tracy, Director

Programs & Statistics Branch
Francis M. Hoffheins

Facilities Branch
Leroy C. Stewart

Inorganic & Agricultural Chemicals Branch
Frederic Arden

Coal Tar Chemicals & Dyes Branch
Louis A. Schlueter

Drugs, Solvents & Detergents Branch
Frank E. Bennett

Plastics & Protective Coatings Branch
Lowell B. Kilgore

FACILITIES & CONSTRUCTION BUREAU
Frank R. Creedon, Chief; William Davlin, Assistant

INDUSTRIAL EXPANSION
William E. O'Brien

LOAN DIVISION
Harvey M. Harper

TAX AMORTIZATION
Ross A. Gridley

Where To Go In Washington

For chemical men winding their devious way through Government regulations, CHEMICAL WEEK has prepared these directories of who does what in NPA and OPS.

NPA, operating arm of DPA, consists of several operating bureaus for the allocation of resources. It carries out the policies set by DPA. Two of NPA's bureaus are of particular interest to the chemical industry: Facilities & Construction Bureau, and Chemical, Rubber & Forest Products Bureau.

The Facilities & Construction Bureau does the detail work on requests for rapid tax write-offs. The Chemical, Rubber & Forest Products Bureau makes analyses of supply and demand for these materials, on the basis of which it allocates materials, prepares conservation orders, and institutes control measures.

One division of OPS — Rubber, Chemicals & Drugs Division — is of particular importance to chemical men; it sets price policy.

OPS
Michael V. DiSalle, Director

RUBBER, CHEMICALS & DRUGS DIVISION
Thomas H. McCormack, Director
George W. Strasser, Acting Assistant Director

RUBBER BRANCH
Chester F. Conner

DRUGS & COSMETICS BRANCH
Joseph P. Folsom

CHEMICALS BRANCH
Alfred T. Loeffler

FOREIGN

Plastic Materials: West German output of plastic materials is currently about 10% of world production. Phenol and urea plastics lead the field with a monthly figure of 2,250 tons.

Manufacture of celluloid, which averaged 258 tons a month during 1950, is now reaching a monthly figure of 300 tons while polystyrene production is 600 tons monthly.

So far West German polyvinyl chloride capacity is still too meager to supply even domestic needs since this material was, until the end of the war, produced mostly in what is now the Soviet zone. Work on this plastic, however, has progressed so well that output is expected to reach 1,700-1,800 tons before long.

Other materials on the German market (although in relatively small quantities) are the acrylics, Perlon (Ultramid B), polyurethane and polyethylene. Current production of the latter is meeting only 6-8% of total domestic needs.

•

Detergents: Shell Oil Co. and a French chemical group, Saint-Gobain, have formed a company, Societe Shell Saint-Gobain to operate a new plant for Teepol detergent near Rouen. Designed for a 25,000 ton-a-year capacity, the new plant will draw its special feedstock—a cracked petroleum wax—from a nearby Shell refinery.

•

Locust Gum: Meypro, an important Swiss producer of locust-bean gum, has just opened a plant near Amsterdam. The company buys its raw material from Mediterranean countries, and processes it into a variety of binding and thickening agents, primarily for export to the U.S.

•

Cellulose: A Mexican cellulose factory will soon be built by Italy's Snia Viscosa. Expected to cost $23 million, the new plant will be designed to turn out 40,000 tons of cellulose and 7,000 tons of wood wool annually.

•

Beryl: Small but workable deposits of the semi-precious stone beryl, ore of beryllium metal that is useful in atomic energy work, have recently been discovered near Delhi City. They are contained in the decomposed feldspar that for some decades has been quarried as pottery clay for ceramic factories.

•

Phosphates in Sahara: Prospecting is currently under way in the Spanish-controlled part of the Sahara desert.

This area, practically unexplored, is thought to contain deposits of phosphates.

COMPANIES. . . .

Damage suits totaling $175,000 have been filed against Richmond Oil, Soap and Chemical Co., Philadelphia, as the result of a four-years-ago accident in a Mantua, N.J., hosiery mill. Roger N. Mozingo and Bernard T. Geiger, both knitters at the Empress Hosiery Mills in Mantua, are asking this amount for injuries they claim to have received when cleaning fluid, supplied by the defendants, ignited while they were cleaning knitting machines.

In blaming the chemical company for their injuries, the two men allege that it prepared and delivered a product which they knew, or should have known, was inherently dangerous and harmful to anyone who might use it.

•

Petrocel Corp.: Celanese Corp. has formed a subsidiary, Petrocel Corp., to carry on oil and gas exploration to assure the company's raw material position. Celanese uses large quantities of petroleum hydrocarbons at its Bishop, Tex., operations and will require more at the plant now under construction at Pampa, Tex.

•

Diamond Alkali Co. A registration statement has been filed with the SEC by Diamond Alkali Co. for 120,000 shares ($100 par) of convertible preferred stock. First Boston Corp. is the principal underwriter.

•

Atomic Energy: The contract between Monsanto Chemical Co. and the Atomic Energy Commission for operation of the Mound Laboratory at Miamisburg, Ohio, and Scioto Laboratory at Marion, Ohio, has been renewed for 4½ years. The two laboratories are carrying out classified work in the atomic energy field.

•

Antara Chemicals: The name of Antara Products Division of General Dyestuff Corp. (GDC) has been changed to Antara Chemicals Division. Antara coördinates and handles non-textile sales of all acetylene chemicals, intermediates and surfactants made by General Aniline & Film Corp.

•

Dow Chemical: Employees and stockholders of Dow Chemical Co. are to be offered 200,000 shares of common stock. Common stockholders will be permitted to purchase one share of Dow common for each share of Dow common held on Dec. 14. Employees will be permitted to subscribe up to 10% of their annual wages. It is estimated that about 67,000 shares will be available to employees.

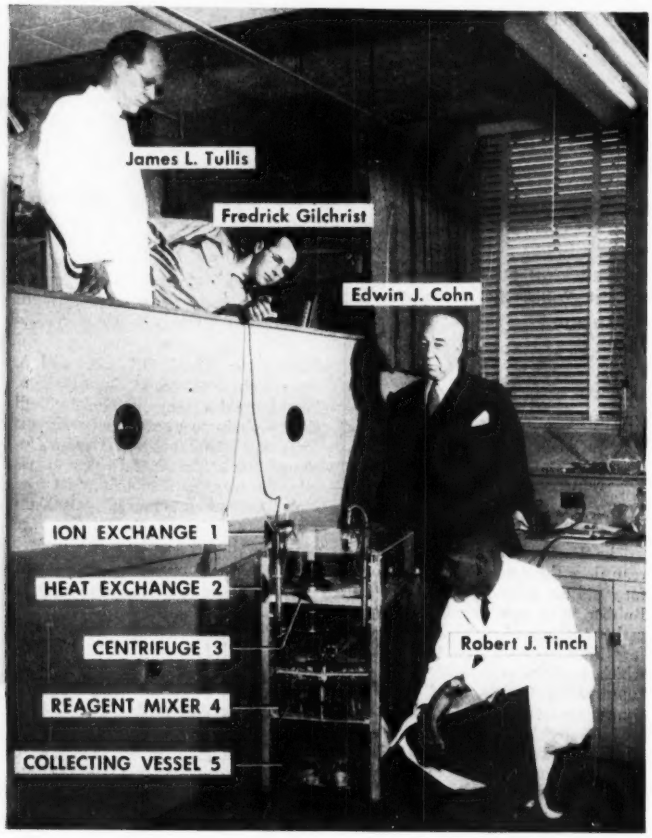
At the same time the Board of Directors declared a common stock dividend of 2½% and quarterly cash dividends of 60¢, as well as the regular preferred payments.

EXPANSION. . . .

Alkane: Standard Oil Co. of Calif.'s capacity for the manufacture of detergent alkane will be increased to 3,000 barrels per calendar day in the latest expansion. Bechtel Corp. holds the $1.5 million construction contract.

•

Ceramic Coatings: Ferro Corp. has joined Solar Aviation to further production of the Solar-developed "Solar-



Blood Engineering

Human blood is a perishable raw material, should be processed without delay. This miniature plant, developed by Edwin J. Cohn and his associates at Harvard University's Laboratory of Physical Chemistry Related to Medicine and Public Health, does just that.

The donor's blood is led directly through non-wettable plastic tubing into an ion exchange column (1), calcium is removed to prevent clotting, and the platelets are collected. The blood is then cooled rapidly to optimum preservation temperature in heat exchanger (2), plasma is separated continuously in centrifuge (3), and at the same time red and white cells are isolated from each other and collected.

A mixing unit (4) adds zinc-glycine reagent to precipitate fibrinogen and other components, and this plasma-globulin precipitate is collected (5) for further processing. The remaining stabilized plasma protein solution is treated to remove zinc, then is ready for emergency use or stockpiling.

CONSOLIDATED

Announces

another important step to help make sulphur go further

Consolidated Chemical Industries Inc. has announced the construction of a plant at Baton Rouge, Louisiana, especially designed to use spent sulphuric acid as a raw material in producing high strength new acid. When this plant is completed—late in 1952—production capacity will be substantially increased without requiring additional sulphur.

This step is the latest in a long line taken by Consolidated in a continuing effort to better serve users of sulphuric acid.

The first step—taken some years ago—was to handle spent acid of various grades. This relieved some users of their disposal problems and it made low cost acid available to other users.

When the supply of sulphur became critical, handling of spent acid was greatly intensified. Furthermore, certain existing facilities were devoted to producing new acid from the lower grades of spent acid.

Now Consolidated is building a large plant especially to process spent acid. This will mean a further improvement in the service available to Consolidated customers.

3196 A

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amic" ceramic thermal protective coatings. The new combine will provide coating materials usable from 900 F to above 2,000 F. The temperature-resistant coatings will find use in the manufacture of jet engines.

•

Dissolving Pulp: Columbia Cellulose Co., Ltd., a Celanese affiliate, is upping the capacity of its plant at Prince Rupert, B. C., by 50%, to 300 tons per day.

•

Glass Fiber: Libbey - Owens - Ford Glass Co. has started production of glass fibers at its new Parkersburg, W. Va., facility. First output of the plant is destined for U. S. Navy use. The first textile fibers are due about December 1.

•

Carbon Black: A 20 million pound-a-year furnace will be the heart of a new carbon black plant to be built for Godfrey L. Cabot, Inc. at Sarnia, Ont. Cost: $2 million.

•

Cryolite & Carbon: Kaiser Aluminum & Chemical Co. has started a $1,355,000 construction program at its Mead reduction plant near Spokane, Wash. The new facilities will help break the critical shortage of carbon and cryolite and complete a plant improvement program begun five years ago.

•

Carbon Black: United Carbon Co. is planning to build a plant for manufacture of carbon black in St. Mary's Parish, La., Expected cost: $2.3 million.

•

Paper Pulp: Expansion of Brown Paper Mill's paper pulp plant at W. Monroe, La., is to cost $3,362,000.

LABOR . . . . . .

District 50 local at Sun Chemical Corp.'s Norwood, Mass., plant has signed a contract renewal agreement calling for a general wage boost of 8¢ an hour. The contract also provides for check-off of dues, vacations, holidays, seniority, and grievance procedures.

KEY CHANGES . .

J. H. Forrester: From manager, Central Division, Stanolind Oil and Gas Co., to manager of research, Standard Oil Co. (Indiana).

David Graham: From financial vice president, Weyerhaeuser Timber Co., to financial vice president, Standard Oil Co. (Indiana).

Sam Gurley, Jr.: From sales manager Durite Products, Borden Co., to manager of resin sales, Barrett Division, Allied Chemical & Dye Co.

Charles E. Kwartler: From director of process development, Winthrop-Stearns, Inc., to director of product and process development, Gamma Chemical Co.

H. C. Meyer, Jr.: To manager, chemical sales, Foote Mineral Co.

Paul John Witte: From head, Central Testing Laboratory of the City of New York, to executive vice president, Strux Corp.

Pinckney L. Frost: From sales manager, Innis Speiden & Co., to assistant manager, insecticide division, S. B. Penick & Co.

Alfred Lippman, Jr.: From manager, production, research and development, Bay Chemical Co., to general manager of the laboratories, Commonwealth Engineering Co. of Ohio.

Jack D. Moore: From assistant to works manager, chemical operations, to plant superintendent, Natividad, Calif. dolomite plant, Kaiser Aluminum & Chemical Corp.

Charles J. Conroy: To manager, sales coordination and export, Foote Mineral Co.

Sulfur Sipper

MISS PAUDINE PUFFINGTON, first cousin of Charley McCarthy, gets her sulfur and molasses without molasses while inspecting Hancock Chemical Co.'s sulfur plant as part of Los Angeles' observation of "Cleaner Air Week." Miss Puffington and her mentor Edgar Bergen (right) were told that Hancock recovers 2,500 tons of hydrogen sulfide each month from refineries in the area, preventing same from becoming 5,000 tons of nose-tingling sulfur dioxide.

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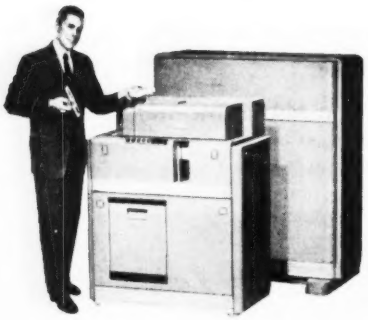
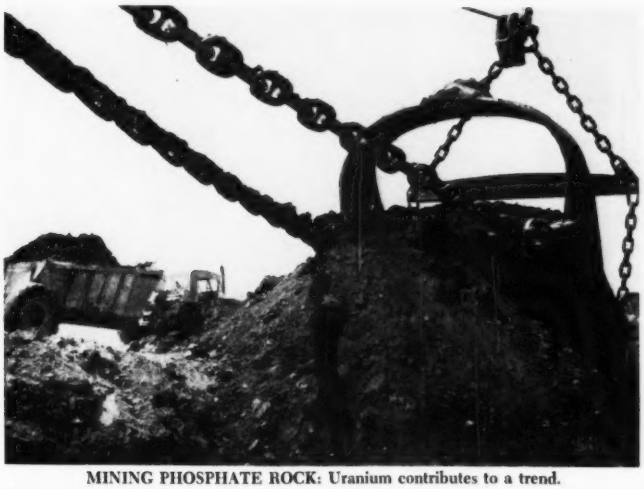


IBM INTERNATIONAL BUSINESS MACHINES



MINING PHOSPHATE ROCK: Uranium contributes to a trend.

Bargain By-Product

New facilities for recovering uranium highlight technical progress in developing phosphate rock as a source.

Recovery from wet-process phosphoric acid is easiest and perhaps of greatest potential significance.

But normal superphosphates, more important tonnage-wise, today are getting the lion's share of research attention.

If producers of phosphate chemicals and fertilizers were shopping around for a salable by-product, the chances are they never bargained for uranium. But that's exactly what they're getting, and fast.

Since the discovery, a few years ago, that uranium was present in the phosphate rock formations of Florida and the Western states, the Atomic Energy Commission has gone all out in an effort to develop practical methods for recovering the vital element.

Most marine phosphate rock contains less than a pound of uranium per ton of rock, but the tremendous tonnage mined annually makes it add up: The potential supply of uranium from this source more than justifies AEC's new-found interest in the phosphate industry.

AEC started the wheels turning in 1947 by getting together with the U.S. Geological Survey to map out the Florida pebble phosphate field, determine where and how uranium is found. Next, mining companies were canvassed for an insight into the fate of uranium in the washing plants. Research, aimed at the development of methods for recovering uranium in the course of manufacturing commercial fertilizer materials, was then initiated at Dow Chemical Co., Battelle Memorial Institute and Massachusetts Institute of Technology.

By mid-1950, a number of proposed schemes had been examined. Most promising was recovery from wet-process phosphoric acid. In the manufacture of wet-process phosphoric, most contained uranium goes into solution upon treatment of the rock with sulfuric acid. When the slurry is filtered, the bulk of uranium is found in the phosphoric acid.

This knowledge, bolstered by considerable process research, is being put to good use. Blockson Chemical Co. is building the first full-scale production plant to recover from wet-process phosphoric acid. Located at Joliet, Ill. the Blockson unit will use a method that has proved its mettle in semi-works operation as part of the company's regular manufacturing process.

A Hitch: Although recovery from wet-process phosphoric is the path of least resistance, there's one important drawback to further intensive development of this aspect of the problem: Only about a million tons of phosphate rock per year are used to make wet-process acid. Since the tonnage going into normal superphosphates far outstrips this figure, research is focusing on recovery from normal superphosphate fertilizers.

Dow put up a small but successful pilotunit at Pittsburg, Calif. When it became apparent that this setup couldn't give all the answers to the technical and economic questions that arose, a larger unit was built in cooperation with U.S. Phosphoric Products Division, Tennessee Corp., at East Tampa, Fla. Now in shakedown operation, this Florida installation will provide data for uranium recovery in full-size plants.

Fits Right in: Production of uranium from phosphate rock fits right in with the trend towards greater use of concentrated fertilizers. Unlike normal superphosphate manufacture, by acidulation with sulfuric acid, concentrated superphosphate requires acidulation by phosphoric acid. The move towards concentrated products like double and triple superphosphate means a need for more phosphoric acid. To give this move a helping hand, and hasten recovery of substantial amounts of uranium, AEC is encouraging expansion of existing facilities and the building of new wet-process phosphoric capacity.

Aid is being given, in the form of applications for rapid write-offs and priorities on critical construction materials. Davison Chemical Corp., for example, has just received a certificate of necessity for a triple superphosphate plant to include uranium recovery facilities. But AEC assistance isn't a foregone conclusion; aid is given only to plants whose process for phosphoric acid appears particularly suitable to by-product uranium recovery.

Other criteria used to determine the kind and amount of possible assistance include plant location, kinds and amount of critical construction materials required, and quality and quantity of phosphate rock to be processed. By-product recovery technology is available only to those who have been cleared under the Atomic Energy Act, but this is more than offset by the ready market awaiting phosphate manufacturers who find the technical data applicable to their own operations.

One Eye on Sulfur: Production of phosphate fertilizers consumed close to 1.5 million tons of sulfur in 1950. No one has to be told of our sulfur supply woes and, by the same token, no one knows just how much sulfur will be available for agricultural prod-

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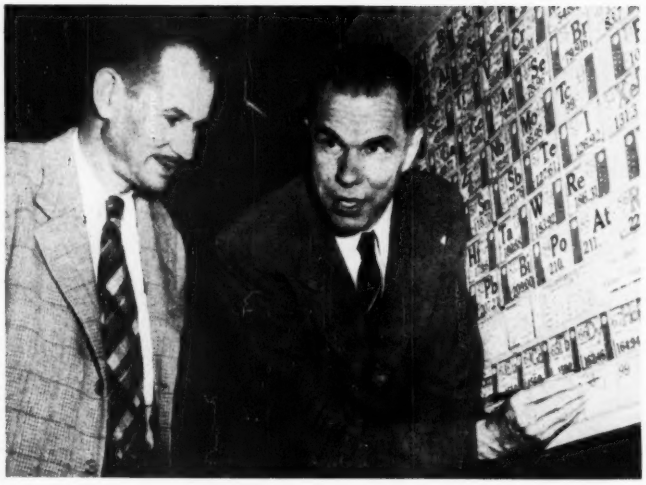

Noble Prize Winners

EDWIN M. McMILLAN looks on as Glenn T. Seaborg writes their new element number 98, Californium, into the periodic chart. The University of California scientists won the award for their contributions to the chemistry of the transuranium elements. New elements aren't a novelty to the pair: Between them, and in addition to Californium, they are credited with the discovery of neptunium (element 93), plutonium (94), americium (95), curium (96) and berkelium (97). The plutonium-producing atomic reactors at Hanford, Wash., are tangible results of their nuclear researches. Moreover, McMillan's phase stability theories have made possible the design of the new ultra-powerful cyclotrons which today are breaching the barriers of the sub-atomic universe.

ucts in the foreseeable future. But it's no secret that a limitation order on sulfur will soon be issued.

The hazy sulfur picture underscores the importance of nitric acid acidulation processes. These processes by-pass the sulfur headache, but run head-on into serious problems of construction materials and economics. Research is now under way on a uranium recovery process for commercial application to solutions made in the course of fertilizer manufacture by acidulation with nitric acid.

AEC is shooting for recovery units in every plant using uranium-bearing phosphate rock as a raw material. Progress toward this goal already has been made with both existing facilities and those in the works. In addition to the companies mentioned before, General Chemical Division of Allied Chemical & Dye Corp. is piloting a by-product recovery plant at its Claymont, Del., sodium phosphate works. In the fertilizer field: Mathieson Chemical Corp. is closing out research at Pasadena, Tex., prior to installing a pilot-plant; Armour Fertilizer Works is trying to apply uranium recovery know-how to its operations at Bartow, Fla.

International Minerals & Chemical Corp. is putting up a new wet-process plant with uranium recovery; Virginia-Carolina Chemical Corp. also will bring in more wet-process capacity, and it too is expected to include recovery facilities.

It's obvious that by-product output of uranium will come from many sources. Production from any one source will necessarily be small, but nonetheless welcome. AEC's view of of the broad picture is reflected in the words of Sheldon P. Wimpfen of the Division of Raw Materials: ". . . In the aggregate, producers . . . in the phosphate chemical and superphosphate field are in a position to make an important and continuing contribution to our domestic supply of uranium."

Special Jobs Needed

New phosphonic and phosphoric acid cation exchangers, developed by Chemical Process Co., are the first of their kind on the market. They probably won't compete with the more conventional types, but should find a place in several special applications. The relatively high cost of the new products imposes a real limit on their

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widespread industrial use. Strictly as an estimate, depending on demand that develops and the price of phosphorus, the exchangers would come to the vicinity of $30 a cubic foot. That's a lot more expensive than any of the sulfonic acids now available.

Consequently, special applications —that can bear the strain of this tariff —will have to be found. A number look promising on the basis of preliminary research:

One involves a therapeutic use in the treatment of excess physiological water absorption resulting from abnormally high sodium concentrations. Current treatment involves a salt-free diet and large doses of carboxylic acid ion exchangers. Because of the phosphonic group's higher activity, the dose can be reduced.

Another potential job makes good use of the selectivity and complexing properties of the phosphonic group. Separation of rare earths and traces of many metallic ions might well be facilitated through techniques developed around these attributes of the new exchangers.

In general, the exchangers are expected to find a niche in hydrogen ion cycle processes.

As might be expected from the nature of the exhange groups, two different levels of activity are observed. The first hydrogen ion is moderately strong and splits salts in much the same way as the sulfonic acid group; the second is a lot weaker, comes into play only at high levels of alkalinity.

The present high price of the new materials by no means closes the door on their industrial future. One factor keeping cost high is a corrosion problem encountered in the manufacturing process. If this obstacle can be overcome, substantial reductions could be in the offing.

•

New Monomer: Triallyl cyanurate may now be had from American Cyanamid Co. in pilot-quantities. Its most promising application is in high-temperature plastics. Mats, prepared by polymerizing the monomer on glass cloth, show good flexural strength at 230 C.

•

Estrone Synthesis: William S. Johnson and R. G. Christiansen of the University of Wisconsin have come up with a comparatively short synthesis of the female hormone starting with anisole. Their method is stereospecific in all but one step, which nevertheless gives the desired stereoisomer as the only crystallizable product.

•

Ethylene Oxide By-passed: Indian researchers report a preparation of taurine which gets around the use of ethylene oxide and pressure reactions. It's done with 2-aminoethyl sulfuric acid, available from sulfuric acid and ethanolamine in quantitative yield.

•

Isolated Element: University of California researchers L. B. Werner and I. Perlman have successfully completed the first isolation of curium from neutron-irradiated americium. The elements were separated with Dowex-50 ion-exchange resin; the curium was isolated as the fluoride and hydroxide.

•

Castor Threat: Spencer Kellogg & Sons, Inc., Buffalo, N.Y., has developed a new chemically modified vegetable oil to replace castor oil in many industrial applications. Trade-named Kelcastol, the product is identical to castor oil in several of its useful properties; viscosity, color, non-drying characteristics, solubility are a few examples. Kellogg says the new product is not based on castor oil, will be freely available and considerably lower in price. Probable applications: replacement for castor oil plasticizers in lacquers, coated fabrics, etc.; component of hydraulic fluids.

•

Standard Additions: Standard solutions of phosphorus 32 and iodine 131 are now available from the National Bureau of Standards. Early research efforts with these isotopes often resulted in large discrepencies in results obtained by different laboratories performing identical experiments. The Bureau's standardization efforts are aimed at correcting this situation.

•

New Wax: Emery Industries, Inc., Cincinnati, Ohio, is now producing experimental quantities of Emery A-805-R Stearanilide, a hard, odorless, waxy solid. The material is compatible with other waxes, should prove useful in polishes, carbon paper, textile auxiliaries, paper coatings, etc.

•

ATA Antidote: Researchers at Argonne National Laboratory report the first successful antidote for beryllium poisoning. It's aurin tricarboxylic acid (ATA). Experiments with laboratory animals are highly encouraging, but considerable testing still must be done before the compound is tried on human victims of beryllium poisoning.

•

Ferment Faster: Miner Laboratories has found production of alcohol from sugar can be speeded up by a new vitamin-like material extracted from sewage sludge.

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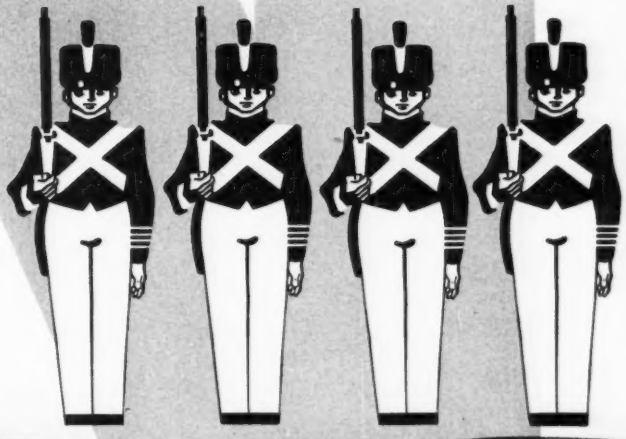

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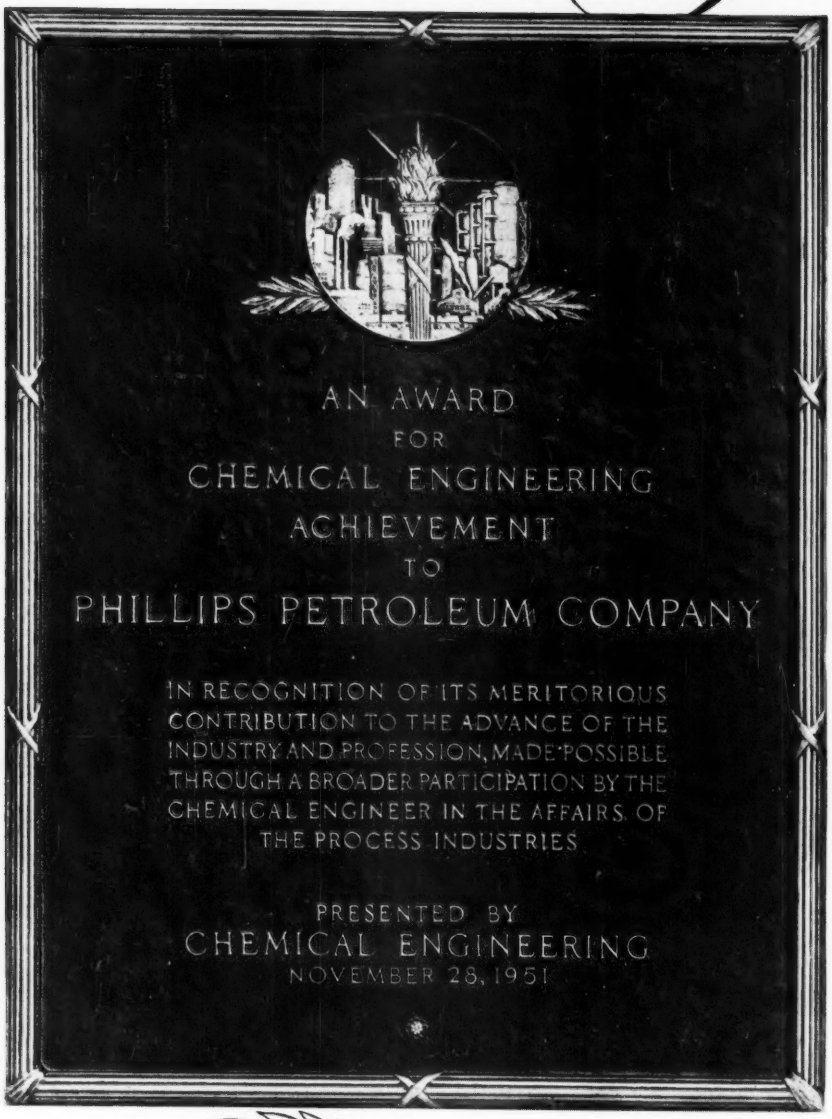
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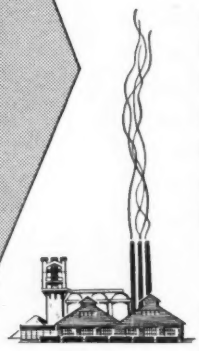

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PRODUCTION . .

DDT: More for Less

Canada's Naugatuck Chemicals has a DDT process which substitutes fluosulfonic for sulfuric acid.

A thirty-fold increase in productivity as well as a cut in capital investment for a new plant are claimed.

Yields are reported to be almost theoretical. Added bonus: Sulfur consumption is reduced by three-quarters.

In the little town of Elmira, Ontario, about equidistant from the industrial centers of Niagara Falls and Sarnia, engineers at the development laboratory of Naugatuck Chemicals, Division of Dominion Rubber Co., Ltd., have come up with a modified process for making DDT. It could be the first significant advance in DDT production techniques since Zeidler performed his classic synthesis in 1884.

The process was developed over a period of years by a team of Naugatuck chemists and engineers working in cooperation with researchers from Dominion's labs at nearby Guelph. Secret of their success: substitution of fluosulfonic acid for sulfuric acid as the dehydrating catalyst.

Dominion Tar & Chemical had previously prepared the pesticide using fluosulfonic acid, but the experiments were all on a batchwise basis. Good results aroused some interest here; but American experts were not enthusiastic about the prospects of finding low-cost fluosulfonic acid.

Naugatuck engineers took the basic idea, found the proper mol ratios for reactants and operating conditions, and made the process continuous. More important, they found an economic method of recovering the fluosulfonic acid.

Actually, research on the process was completed over two years ago but Naugatuck has just taken the wraps off. And although the company has not put up a commercial plant to exploit the process, it did run a pilot plant for some time, turned out several thousand pounds. The only Canadian producer of DDT, Naugatuck has had a good chance to compare its process with the conventional one; and management agrees that if it decides to expand production facilities, it will try the fluosulfonic acid method. Furthermore, the company reports that it is ready to consider licensing the process to U. S. manufacturers.

Capital Crux: One of the characteristics of Naugatuck's synthesis is an almost instantaneous reaction which makes a continuous process attractive. The holding time in each of two reactors in series, for instance, is ten minutes. That means a total reaction time of 20 minutes instead of the 10 to 14 hours Naugatuck has found necessary for its sulfuric process.

It also means a corresponding increase in productivity: Naugatuck has been able to produce eight pounds of DDT per hour per imperial gallon of reactor or about thirty times the productivity attainable from the conventional process. That, in turn, means a smaller capital investment for a new plant; Naugatuck estimates a 20% reduction in cost.

In addition, no by-product *p*-chlorobenzene sulfonic acid is formed as in the sulfuric process; and as a result, yields are higher. Naugatuck engineers report, in fact, that they have been able to get yields approaching theoretical. Based on chloral, yields run 97-98%—or about 10% higher than comparable yields for the sulfuric process. Based on monoclorobenzene, yields are about 80%.

Catalytic Key: Like the present method for preparing DDT, the Naugatuck process involves the reaction of chloral and monochlorobenzene to yield DDT and water. In order for the reaction to proceed, the water must be removed, and it is here the processes differ.

Instead of concentrated sulfuric acid, Naugatuck uses two mols of fluosulfonic acid; this reacts with the water to form one mol of sulfuric acid, one mol of hydrofluoric acid and leaves one mol of fluosulfonic. The hydrofluoric acid remains in solution with the spent acid. After the spent acid is separated from the DDT, the hydrofluoric acid is converted back to fluosulfonic acid by treatment with fluoleum (sulfur trioxide and fluosulfonic acid). One mol of each reactant regenerates two moles of fluosulfonic. A flash distillation of the spent acid recovers the fluosulfonic acid. Theoretically, no fluosulfonic acid is used up in the process, but in practice

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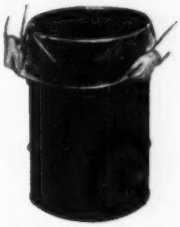

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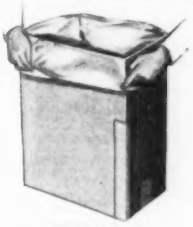

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Steel Techniques for Titanium

EXPERIMENTAL ASSEMBLY of shrouded Piasecki exhaust system is checked for fit of titanium and stainless steel components by employee of Ryan Aeronautical Co. (Calif.). After extensive investigations, Ryan engineers are convinced that most stainless steel forming techniques can be adapted to the fabrication of titanium parts similar to the Piasecki shroud. Titanium's affinity for lead would make lead dies impractical, but Ryan thinks steel or cast iron dies should do the trick. Use of heated dies and a controlled atmosphere furnace would be economical for large-run production.

losses run about 10%.

Naugatuck's process is attractive from the standpoint of sulfur conservation too. Use of fluosulfonic acid reduces over-all sulfur consumption to about a quarter of that consumed in current commercial processes. That alone might be enough incentive to give the process a commercial trial.

Hot to Handle: Biggest problem posed by the new process is the hazard inherent in handling fluosulfonic acid. A flesh burn from it combines the action of sulfuric and hydrofluoric acids. Naugatuck engineers, however, claim that danger can be minimized by using small reactors, instrumentation throughout the process, and careful control. They also say the corrosion problem can be solved without using critical materials of construction.

Patent Poser

It's always hard to measure commercial significance of a new process from the bare details of a patent. But if a recent one—issued to Everett Gorin and assigned to the Pittsburgh Consolidation Coal Co.—is all the patent claims imply, it could go a long way toward revolutionizing current thought on converting carbon to energy.

Right now, officials of the company are unwilling to discuss the patent or its potential applications. But that, in itself, could be an indication that they have something "hot." Evidence that the Patent Office considers the development new can be found in the speedy processing of the patent. Application was filed June 17, 1950; the patent* is dated Oct. 9, 1951. And no references were cited by the Office in its prosecution of the case.

In the Soup: Gorin's process involves a fuel cell which generates electricity by the heat of combustion of water gas. He points out that other fuel cells have been developed to operate along the same lines; but he claims his has almost double the thermal efficiency (electrical output divided by the heat of combustion of the gas). His has 75% while previous ones have not been able to get efficiencies higher than 40%.

Basically, Gorin's process consists of passing steam through a fluid bed of any carbon-containing material (char in his "preferred" embodiment). An oxidizing gas (air) is directed past the anode of the fuel cell and by means of a solid electrolyte oxidizes the water gas which is directed past the cathode. Part of the resulting heat

* U.S. Patent 2,570,543

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Hardboard: Wood Conservation Key

BIG SCOOP LOADER of Forest Fiber Products carries wood chips that have been ground from wood slabs recovered from the forest. Operating on "waste" material, the hardboard industry is one of the fastest growing in the West. Forest Fiber is currently the biggest producer but others are coming into the picture. Within the last three years, three plants have been put up, five others are now in the pilot stage. In another year, these plants—representing $20 million—will be turning out 40% of the nation's hardboard.

of combustion from the water gas is used to generate electricity though the electrolyte.

Presumably, the key to the high efficiency rates is the fact that the fuel cells are directly immersed in the fluid bed. Because of the nature and position of the bed, energy that is not used in generating electricity, released in the form of heat, is transferred quickly and uniformly to the bed. Since the effluent air becomes heated in the process, it is sent through exchangers where it heats the incoming gases.

Gorin found that thermal efficiency was related to the conversion of steam to synthesis gas. When 35% conversion was achieved, thermal efficiency was 50.7%. At 70% steam conversion efficiency was 73.3%; and at 90% conversion, 75.5%. To get the required conversion he used highly reactive chars or a gasification catalyst like sodium carbonate.

Costs? In any event, the patent leaves many questions unanswered. Probably the biggest: How would the cost of a plant—or machine—using Gorin's method compare with costs for present commercial plants? If the costs compare favorably, and the high efficiencies are attainable on a commercial scale, it could conceivably revolutionize the industry.

EQUIPMENT. . . .

Easy Reading: A magnifier equipped with a pair of spring clamps is being sold by Fisher Scientific Co. Adaptable to any standard thermometer, the magnifier is said to enable an operator to take a quick reading from points up to six ft. from the thermometer. It is accompanied by a hairline which can be set at any desired temperature.

•

Rubber Impregnant: The Kirk White Chemical Co. (Oconomowoc, Wis.) is now making a rubber derivative which it says may become its major product. As an impregnant for metal castings, the material is said to be superior to standard impregnants since it can be used without the application of heat. Air pressure can be used to force it more readily into the pores and cavities of the metal to be treated.

•

Bigger Blowers: Billmyre Blower Division (Lamson Corp.) has added larger blowers to its standard line. Models operating on 200 hp. are available, will deliver air pressure up to 3 psi. As with the smaller blowers, constant pressure is maintained, power consumption varies with the volume used.

There is no shortage of

M·G·K ALLETHRIN!

VOLUME LOWERS PRICE!

INCREASED SALES make possible our current price reduction of 10%. Present schedules permit us to offer prompt and regular deliveries in large quantities at this new low price.

TESTED AND ACCEPTED by military and civilian producers, M.G.K. Allethrin has excellent knockdown, killing power, and fast action. Combined with M.G.K. Pyrethrum and suitable synergists it makes superior aerosols and sprays.

WRITE FOR INFORMATION. We offer complete aerosol mixes, sprays and concentrates . . . partial formulations . . . or purest basic ingredients. Write for complete information and "Save the Scientific Way with M.G.K."

McLaughlin • Gormley • King Company, 1715 S. E. 5th St., Minneapolis, Minn.

Scarabaeus sacer Sacred beetle of ancient Egypt. Model for carved stone amulets and scarabs.

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where this week's news determines next week's decisions.
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providing swift coverage of news vital to management,
is timed to the pace of this magical,
fast-moving field.
Its brisk style and informative reports
have won ready acceptance among chemical businessmen everywhere.
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MANAGEMENT MEN ARE TALKING ABOUT . . .

Chemical Week

ABC • ABP

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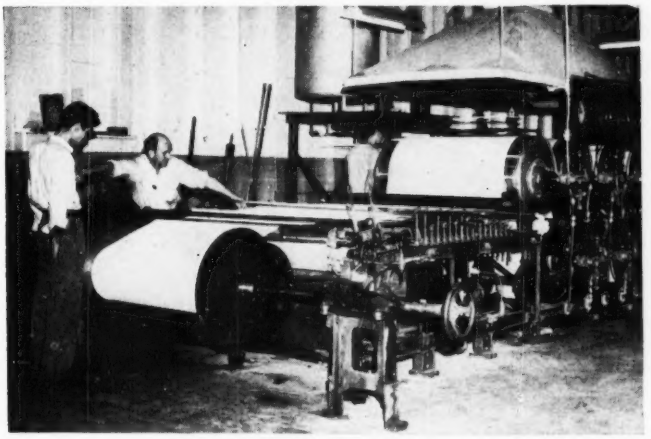

NYLON SIZING: Polyacrylic acid is booming.

Sizing Up the Market

Polyacrylic acid, after one year on the market, already has captured significant portions of the nylon sizing business.

Polyvinyl alcohol, however, is still the choice of nylon hosiery producers who wet-weave the fiber; acrylic acid would corrode knitting needles.

Mushrooming production of new synthetics brings further search for sizings. Acrylic polymers are one answer.

Before synthetic fibers began their meteoric rise, textile processors didn't have to look beyond starch when they wanted a sizing material. It was—and is—cheap, readily available and does the job.

But when nylon came out of test tube and into fiber, chemists found that starch wouldn't work here. Since then, many substances have been proposed—but the current apple of textile men's eyes is polyacrylic acid.

During the past month, B. F. Goodrich Chemical began commercial production of the acid, joining the pioneering Rohm & Haas and American Aniline & Extract.

In about a year's time, polyacrylic acid has taken over about 60% of the nylon size market. The other 40% is still held by polyvinyl alcohol, a less corrosive substance when wet, which must be used in wet-weave hosiery knitting.

A size is put on a yarn to keep the individual fibers from fraying. Sizings also make it easy to remove dirt and grime picked up during the weaving process.

Future prospects are bright: Nylon, now being produced at about a 165 million-pound-per-year rate, is due for considerable expansion. In addition, sizing needs for the newer synthetics will have to be met.

Biggest outlet for polyacrylic acid is in flat-woven nylon goods. Since two pounds of acid (100% basis) is needed to treat every 100 pounds of nylon in the warp, the present market is about 500,000 pounds of acid. Tricot (dry-knitted) fabrics, while probably equalling flat-woven goods in output, need only half a pound of size for 100 pounds of fiber. That adds up to a marketwise potential of 250,000 pounds of sizing acid.

Wet-Knit Problems: The remaining nylon output (probably about 60 million pounds) goes into hosiery, where wet weaving makes use of polyacrylic acid impractical. Polyvinyl alcohol will not corrode knitting needles. Polyacrylic acid is non-corrosive when used in dry-knitting, though it must be applied in stainless steel equipment.

A good many variations are possible in sizing preparations, since the degree of polymerization can be varied to give different properties.

Rohm & Haas provides Acrysol A-1, a dispersion of 25% solids designed for flat-weave warp sizing. Its Acrysol A-3, while also supplied in 25% strength, is polymerized to a further extent for use in protecting tricot-knit yarns.

Goodrich, in its textile size debut, markets its Good-rite Ts-20 for both tricot and flat-weave fabrics. The dispersion here also contains 25% solids.

American Aniline, on the other hand, supplies sizes at more than one strength. Two compounds designed especially for spun nylon are Orthocryl-S and -C, containing 12% and 19% of solids. For normal flat weaving, there are Orthocryl-25 and -25X. Both are 25% suspensions, but the "X" variant contains a plasticizer in addition. For tricot sizing, the company supplies Orthocryl-140 and -140X, with plasticizer.

American Aniline also markets polyvinyl alcohol and boric acid compounded together under its PM-90 label.

Du Pont produces polyvinyl alcohol in several molecular weight ranges. For hosiery sizing, it recommends application of an 8% suspension of its 52-22 Elvanol, or a 10% level of the more highly polymerized 51-05.

Fiber Future: Market for nylon sizes will expand, quite naturally, as fiber production goes up. In the immediate future, Chemstrand's new plant and Du Pont's many projects will see to this.

In addition, the polyacrylic sizes—as they are, or in modifications—may find uses as sizes for the new synthetics. As presently formulated, they don't last throughout processing. Perhaps by permitting a greater polymerization of the acrylic acid, by esterification or by copolymerization, better sizing qualities for the new fibers can be obtained.

The ultimate size for these fibers hasn't been found as yet, but there's every chance that acrylic acid derivatives may take over at least a share of this market.

Hydroponic Harvest

Hydroponic farming—the cultivation of vegetables, fruits, and flowers by means of chemicals and water—looks like a future market for chemical manufacturers.

Already hydroponics is on the way to becoming an industry of importance in Florida, for there more than 25 commercial growers are supplying local customers with first quality vegetables, hope soon to send a part of their crops to Northern markets.

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DOW CORNING ANTIFOAM A

To get the most out of your process equipment, add a trace of Dow Corning Antifoam A and use the space you've been wasting on foam. You'll process most of your most violent foamers, even under vacuum or continuous heat, without waste or hazardous overflow.

That's because Dow Corning Antifoam A kills foam faster and in a wider variety of foamers than any other material known. Practically odorless, tasteless and non-toxic, it is safe to use in food and drugs at concentrations up to 10 parts per million—many times the concentrations normally required.

That kind of efficiency makes Dow Corning Antifoam A the most economical as well as the most versatile defoamer available.

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Dept 83-12
Midland, Michigan

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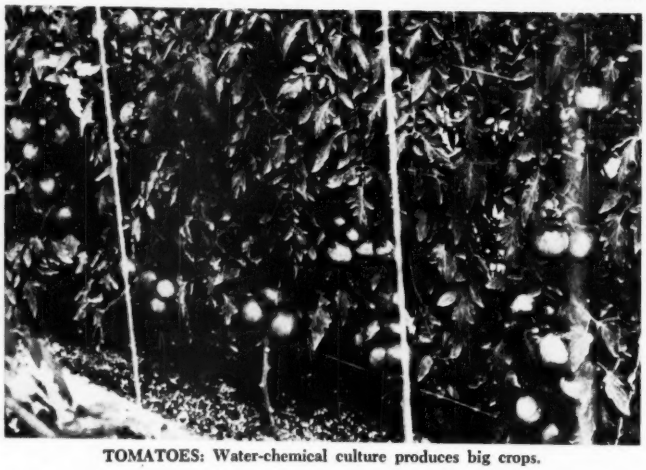


TOMATOES: Water-chemical culture produces big crops.

But interest isn't confined to Florida. The Army has the largest installation in the world near Tokyo where 80 acres provide troops in Korea with 60 tons of vegetables per day, and in this country there are more than 100,000 hydroponic home gardens.

And it is the home garden group that so far has provided specialty manufacturers with their most enthusiastic customers. Such factory mixes as Hyponex made by Hydroponic Chemical Co. (Copley, O.); Hy-Gro, put up by McCormick & Co. (Baltimore); and 10 E-M, a product of Flagler Hydroponics (Miami) are being bought in ever increasing quantities.

Commercial growers buy their chemicals in bulk and do their own mixing according to various formulas, some using the U.S. Army formulation, others solutions worked out by laboratories at Purdue, University of California, University of Miami, Ohio State and others.

Small Farms: Most commercial farms are small, comprise one-four acres of shallow concrete beds filled with gravel. Twice daily a water-chemical solution is fed to the bottom of these beds through concrete or wooden sluiceways. It is then quickly run out and collected in sumps for recirculation.

The solution itself usually contains salts of nitrogen, phosphorus, sulfur, potassium, calcium, and magnesium to which must be added small amounts of manganese, boron, zinc, and iron. Lately molybdenum and cobalt have also been tried as growth stimulants but with indecisive results.

Cash Returns: Best crops for cash returns are such stocks as tomatoes, cucumbers and beans. In a 10,000-ft. bed, for example, Flagler Hydroponics harvested $10,000 worth of tomatoes in 3½ months while Vita-King Farms (Hypoflux, Fla.) has consistently picked a ton of tomatoes per crop in each 150-ft. bed it has in operation.

Growth records achieved by the chemical and water culture are phenomenal when compared to soil cultivation. Matured tomatoes can be picked in 70 days as compared to 160 days for ordinary farming. Hydroponic products, moreover, are said to be much tastier than their hothouse or soil grown competitors, fetch much higher prices at the grocery store.

War Baby: Chemical farming got its biggest commercial boost during World War II when the U.S. Army Experiment Station at Pratt General Hospital in Miami trained men to be island farmers in the Pacific. The report has it that General "Hap" Arnold thought this a smart way to supply troops in remote areas with fresh vegetables. Farms were established first on Ascension Island, then later on New Guinea and Iwo Jima.

After the war some of the soldiers who received their "hydroponic basic" with the Army, returned to Miami to start commercial farms of their own. Other such enterprises were begun by small home gardening enthusiasts turned professional.

Their growth, together with the rapid increase in hydroponic home gardeners, has been equalled by the number of new formulations specialty makers have introduced to serve this new chemical market.

•

Shoe Shiners: Griffin Manufacturing Co. has just begun distributing to shoe, shoe repair, and department stores a new shoe polish called Micro-

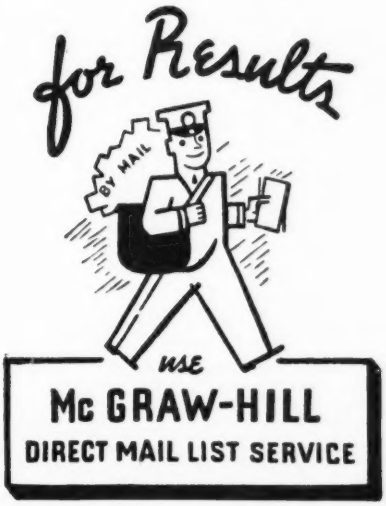
Double Barrel Advertising

Advertising men agree – to do a complete advertising job you need the double effect of both Display Advertising and Direct Mail.

Display Advertising keeps your name before the public and builds prestige.

Direct Mail supplements your display advertising. It pin-points your message right to the executive you want to reach – the person who buys or influences the purchases.

More and more companies are constantly increasing their use of Direct Mail because it does a job that no other form of advertising will do.



McGraw-Hill has a special Direct Mail Service that permits the use of McGraw-Hill lists for mailings. Our names give complete coverage in all the industries served by McGraw-Hill publications – gives your message the undivided personal attention of the topnotch executives in the industrial firms. They put you in direct touch with the men who make policy decisions.

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Probably no other organization is as well equipped as McGraw-Hill to solve the complicated problem of list maintenance in industrial personnel. Our lists are compiled from exclusive sources, based on hundreds of thousands of mail questionnaires and the reports of a nationwide field staff, and are maintained on a twenty-four hour basis.

In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want.

Ask for more detailed information today. You'll be surprised at the low over-all cost and the tested effectiveness of these hand-picked selections.

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XYLOL
HI-FLASH SOLVENT
COSOLS
52-N-3
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CREOSOTE OILS
SHINGLE STAIN OILS
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NEVILLE

LX-767
SHINGLE STAIN OIL

A new improved shingle stain oil which will give you a better pigmented or non-pigmented oil *at less cost.*

Mild odor, good penetration, uniform. Because of its light color you can easily formulate colored oils economically.

Also useful as a pentachlorophenol solvent.

CE 2-E

THE NEVILLE COMPANY
PITTSBURGH 25, PA.
Plants at Neville Island, Pa. and Los Angeles, Calif.

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BUTYL OLEATE
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DIBUTYL TARTRATE
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Industries

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ESTABLISHED 1921
STATE ROAD and COTTMAN AVE. PHILADELPHIA 35, PA.

SPECIALTIES . . . .

sheen. Marketed in six colors ranging from tan to cordovan to black, the new polish is said to be harder in texture than other stain polishes, will neither cake nor dry out, and may be applied sparingly because it penetrates the leather and stains it instead of merely coating the surface of the shoe. These properties are attributed to a new formulation based on a composite wax to which certain undisclosed chemicals have been added.

•

Chlorophyll Mouthwash: Pan American Laboratories, Inc., has been organized in Miami by a group composed largely of dentists to introduce Benephyll, a chlorophyll-containing mouthwash.

•

Combination Fungicide: A fungicide which combines copper hydroxynaphthenate and copper 8-quinolinolate has been introduced by Nuodex Products (Elizabeth, N.J.). Marketed under the name Nuodex Copper QN-18%, it meets Government specification MIL-D-10860.

•

Trichlorobenzene: Technical trichlorobenzene, effective in termite control, as a solvent for fats, oils, waxes, and resins, and in the manufacture of dye intermediates is now being commercially produced by Kolker Chemical Works, Inc. at its Houston plant.

•

Fabric Softener: Flufup is the trade name of a new household specialty—a towel and diaper "fluffer"—which Unique Co. (New York) is just beginning to distribute in the New York area. Added to laundry wash water, the blue-colored liquid (59¢ for a half-gallon bottle) gives clothes a soft finish, works on such stiff fabrics as corduroy and denim.

•

Carbon Cleaner: Magnus 751 is a new cleaner for the removal of carbonaceous deposits from the tubes of fuel oil heaters without dismantling the equipment. A product of the Magnus Chemical Co. (Garwood, N.J.), the cleaner is said to be especially effective on heaters using Bunker C oil.

•

Trade Name Tussle: A recent ruling by Mexican courts may prohibit Merck & Co. Inc., from distributing its products under the corporate name Merck (North America), Inc. in Mexico. They claim that the corporate name of the American Co's subsidiary interferes with one being used by Merck Mexico, S.A., a firm of Ger-

SPECIALTIES . . . .

man origin which the Mexican government took over after the last war. The current ruling reverses an earlier decision of the Economy Ministry. Merck will appeal.

•

Spot Eraser: A chalk-like combination of five oil-loving chemicals, Janie Spot Eraser, product of Aeroxon Sales Co. (New York), is said to remove stains made by grease, oil, food, and dirt. Packaged in a handy lip-stick size container (20¢ at dime stores, railroad stations, drugstores), the "eraser" is simply rubbed on spots, left a few minutes, then brushed off.

•

Protective Finishes: American Paint Co. (Ambler, Pa.) has recently undertaken a research program for the Office of the Quartermaster General. It will investigate and develop pre-paint treatments and final chemical treatments for the protective finishing of metal surfaces on such items as metal containers and equipment hardware.

•

Silicone Repellents: Among the newer silicone water repellents used in treating exterior masonry (*CW, Sept. 29*) are Monoseal, made by the Monroe Co. (Cleveland); Paviseal, marketed by Pavinoleum, Inc. (New York City); and Silipruf, a product of Preco Chemical Corp. (also New York).

•

Antibiotic Formulations: Three new veterinary antibiotic formulations are being produced by Chas. Pfizer & Co.: a terramycin ointment for combatting bovine mastitis; Combiotic P-S Veterinary, procaine penicillin G, buffered sodium penicillin G and dihydrostreptomycin; Pronapen Veterinary, penicillin compound designed for aqueous intramuscular injection.

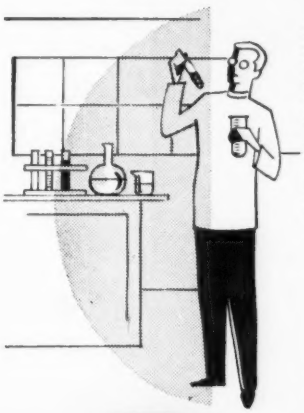
•

Bandage Replacing Cast: A plasticized bandage which can be used in place of a plaster cast has been invented by Herbert W. Hoyt of Berea, Ohio. The bandage, which weighs one-sixteenth of the cast it replaces, is made from a silicious clay and polyvinyl resin. It does not stick to skin or hair and can safely be placed over burns or open wounds, Hoyt reports.

PICTURES IN THIS ISSUE:

Cover (bottom)—Elwood M. Payne; p. 12—General Motors; p. 13 (left)—Dick Wolters, McGraw-Hill Photo; (top & bottom-right)—Wide World; p. 14—Monsanto Chem. Co.; p. 16—Walter R. Fleischer, Harvard Univ.; p. 21—Monsanto Chem. Co.; p. 22—Wide World Photo; p. 32—Leonard Delano Photo; p. 35—Textile World, McGraw-Hill Photo; p. 48—Heyden Chem. Corp.

CONFIDENCE



Your hidden specification . . . but nevertheless your most important consideration.

Experience and know-how obtained through years of specialization in the manufacture of Fatty Acids is indicative of A. Gross & Co.

Confidence in A. Gross & Co. Fatty Acids is assured by the utilization of the most modern plant facilities and equipment available . . . but this alone is only part of the story.

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Stearic Acid
Coconut Fatty Acids
Cottonseed Fatty Acids
Soyabean Fatty Acids
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MANUFACTURERS SINCE 1837

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295 MADISON AVE., NEW YORK 17, N.Y.

A New, Low Priced Corrugated-Perforated Runner Matting

TRAFFIC-TRED

Particularly suitable where there are wet floors. The ridged bottom affords aeration and drainage. Good scrapeage qualities. New cross-ribbed squeegee design on top side.

Made from cotton cord and rubber compounds. Standard semi-closed slot construction (open on ends only). 7/16" thick. Three widths, 24", 36", and 48", with sections 24" x 12", 36" x 18" and 48" x 12" (two 24" sections) available in rolls.

AMERICAN MAT CORPORATION
"America's Largest Matting Specialists"
1797 Adams Street Toledo 2, Ohio

Please send literature and prices on Traffic-Tred Matting.

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FIRM .....
STREET .....
CITY & STATE .....

In Canada: American Mat Corporation, Ltd., Canada Trust Bldg., Windsor, Ontario

FACTS about PHENOL

GATX 30969
GATX 30969
SPRING TYPE SAFETY VALVE (2)
1" AIR CONNECTION OR AIR VENT
VACUUM RELIEF VALVE
2" TOP UNLOADING PIPE CONNECTION
BOTTOM OUTLET VALVE ROD FOR OPENING BOTTOM OUTLET VALVE
SUMP ARRANGEMENT
BOTTOM OUTLET

IN times of shortages, additional effort should be expended to use materials efficiently and wisely. The importance of phenol in so many industries has lead Dow to believe that the following information may be of assistance in helping you realize greater value from phenol.

Phenol is used in many manufacturing processes. It is used in the manufacture of: bonding agents for plywood—thermosetting type plastics—toluene—lubricating oils—lubricating oil additives—medicinals—dyes—perfumes—explosives.

Dow believes that complete and comprehensive information about phenol is extremely valuable at this time and is ready to help you further with advice and technical assistance. If you desire additional information, write to Dow, using coupon below.

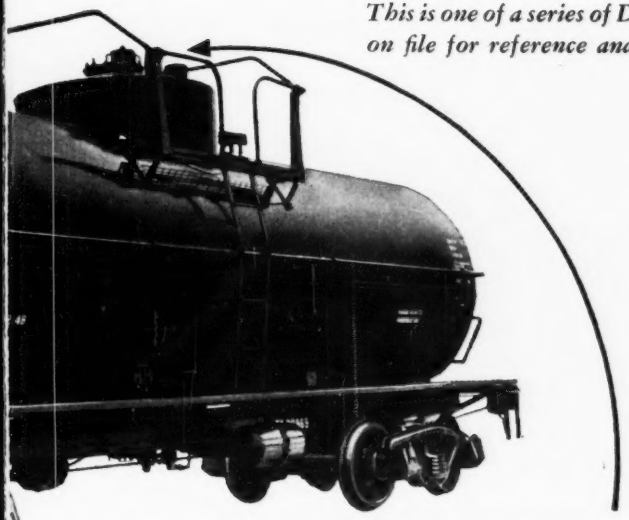
1. *Top unloading by pumping*

(1) Remove housing covering 1" air vent valve and 2" top unloading pipe valve. (2) Vent the car carefully by opening the 1" vent valve. To make sure that car is vented, open manhole cover bolts one turn at a time until cover is loose. If there is no pressure present, open manhole cover. (3) Connect low pressure steam to car heating coils. (4) Avoid heating contents of the car above 70°C. Phenol should be ready for unloading when the bottom and ends of the car are warm to the hand, providing the car is not insulated. (5) Remove the plug from the 2" top unloading valve and make sure that there is no unmelted phenol or foreign matter obstructing it. (6) Connect discharge side of pump to line running to the storage tank. Storage tank should be well vented. (7) Connect unloading line to the suction side of pump. The manhole cover may be left open for inspection. (8) Disconnect the piping after phenol has been pumped from car and wash off any phenol. Close all dome openings and blow out steam coils to prevent any residual condensate freezing and bursting the coils. Do not replace steam inlet and outlet caps. (9) Turn "Dangerous" placard to indicate empty car now is ready to return to Dow.

2. *Top unloading by air pressure*

Prepare the car for unloading by following items (1) through (5) under top unloading by pumping. Then: (6) Close manhole cover and bolt securely in place. (7) Connect the unloading line to the 2" top unloading pipe connection. Be certain the storage tank is vented. (8) Connect the air supply line (air pressure not to exceed 20 p.s.i.) to the 1" vent valve. (9) Observe the same procedure after the car is empty of phenol as before.

This is one of a series of Dow advertisements you may wish to keep on file for reference and information. Write Dow for reprints.



UNLOADING PHENOL TANK CARS

Be sure that tank cars stand on a level section of track in order to assure complete unloading of the car. Either of the following two methods may be used, but the first, *top unloading by pumping* is the safer, and the one recommended.

Physical Properties of Phenol

Phenol is a white crystalline chemical compound with an easily recognized aromatic odor.

Molecular Weight 94.11	Heat of Fusion ..... 2690 cal./g. mol. 28.6 cal./g. 51.5 B.t.u./lb.
Congealing or Freezing Point 40.9°C.	Heat of Vaporization at 182°C. ..... 103.4 cal./g. 186.1 B.t.u./lb.
Boiling Point at 760 mm. Hg. 182.0°C.	Heat of Combustion ..... 732 K. cal./g. mol.
Density Solid—at 25°C. ..... 1.071 g./ml. Liquid—at 50°C. ..... 1.049 g./ml.	Flash Point ..... 79.0°C.
Critical Points Critical Temperature ..... 419°C. Critical Pressure ..60.5 Atmospheres	Solubility Water in Phenol at 25°C.—71.28 g./100 g. solution Phenol in Water at 25°C.—8.66 g./100 g. solution
Specific Heat Solid—at 4.0°C. ..... 0.306 —at 22.7°C. ..... 0.338 Liquid—70-74°C. 0.548	Phenol is soluble in all proportions at room temperature in alcohol, benzene, monochlorobenzene and ether.
Viscosity Liquid at 45°C. ..... 4.0 centipoises	

STORAGE

In solid state, phenol may be stored in the original container for considerable time without discoloration. Molten phenol, however, discolors when in contact with iron or copper-bearing metals. The higher the temperature, the more rapid the discoloration.

Storage tanks may be either welded or riveted construction. Tanks are usually equipped with steam coils for melting the phenol (temperatures should not exceed 70°C.) for transfer.

TRANSFER

When molten, phenol can be transferred like any other liquid, by gravity, pumping or blowing. Centrifugal and turbine type pumps are generally used and are satisfactory. A pump manufacturer can recommend suitable equipment when your requirements are known. Long fiber asbestos, lubricated with graphite, gives reasonable service when used as a pump packing. Pipe lines for handling phenol should be heated to maintain it in a liquid state. Steam-traced lines are usually used. Outside pipe lines in cold climates should be traced with ⅜" to ¾" steam lines dependent on the length of run and size of the line to be heated, with the tracer along the bottom of the pipe line, and both covered together with standard pipe covering. Short runs inside heated buildings should be traced on the under side of the pipe line, but need not be covered to keep the phenol above its melting point if more than 100 p.s.i. steam is used in the tracer line.

PRECAUTIONARY MEASURES

Phenol produces painful and dangerous burns of the skin in a very short time and death may result from external contact even on an area as small as the hand and forearm. It is classified by the Interstate Commerce Commission as a Class B poison and all containers bear the prescribed "DANGEROUS" placard or "POISON" label. Fumes are irritating to eyes and nose.

Persons engaged in handling phenol should always wear goggles or face shields and rubber gloves. Additional protection such as rubber boots, aprons and hoods may be advisable.

There should be adequate washing facilities immediately available. These facilities should include a shower bath or a water hose which gives a large stream of water under low pressure. For washing eyes, use a flow of water under low pressure.

In case phenol is spilled, it should be thoroughly washed away with water. Torches or heat sources other than low-pressure steam should never be used on phenol containers. No workman should ever be permitted to enter an empty tank or car which has been used for phenol until it has been thoroughly washed out, followed by a thorough steaming for approximately 12 hours.

In case of accidental contact: 1. Begin a thorough washing with large volumes of water. 2. Remove all contaminated clothing. 3. Call a physician.

If you have a Phenol problem

write DOW for information and technical assistance

THE DOW CHEMICAL COMPANY
Midland, Michigan

The Dow Chemical Company, Dept. OC-4A
Midland, Michigan

☐ **Please send me literature about phenol.**
☐ **Please send _____ reprints of this advertisement.**

Name _____ Title _____

Company _____

Address _____

City _____ State _____

DOW
CHEMICALS
INDISPENSABLE TO INDUSTRY AND AGRICULTURE

BICARBONATE of SODA
MONOHYDRATE of SODA
SAL SODA

STANDARD QUALITY

CHURCH & DWIGHT CO., INC.

Established 1846

70 PINE STREET **NEW YORK 5, N. Y.**

IF IT'S here...

IT'S news...

IT'S WORTH STOPPING TO SEE!

Maybe Industry doesn't maintain show windows on Fifth Avenue or State Street or Wilshire Boulevard like America's great department stores. But your industry has a mighty effective show window ... *and this is it* ... this magazine. In these advertising pages alert manufacturers show their wares. Here you will find up-to-the-minute news about products and services designed to help you do your job better, quicker, and cheaper. To be well-informed about the latest developments in *your* business, *your* industry ... and to stay well-informed ... *read all the ads too.*

F-128

McGRAW-HILL PUBLICATIONS

BOOKS...

Boiler Feed Water Treatment, third edition, by F. J. Matthews. Chemical Publishing Co., Inc., New York, N.Y.; 207 pp., $4.50.

Reporting on the results of recent research in the field of boiler feed water treatment, this volume discusses new developments in plant construction and presents revised views on operation problems along this line. Some of the difficulties treated here are caustic embrittlement, carbonate and phosphate conditioning, the mechanism of scale formation, priming and production of wet steam; a critical survey of the available corrective methods for dealing with these operational troubles is also included. Other sections appearing here cover such topics as natural water supplies, corrosion, and water analysis and testing methods.

Briefly Listed

THE MOLDS AND MAN: AN INTRODUCTION TO THE FUNGI, by Clyde M. Christensen, presents the basic facts concerning fungi, with the emphasis on common molds that come into the everyday life of humans. Fungus parasites affecting plants, animals, commercial products, microorganisms and insects, fish and man are discussed here. University of Minnesota Press, Minneapolis 14, Minn., $3 a copy.

ABSTRACTS OF DEFENSE REGULATIONS, new periodical published monthly, contains a summary of orders and regulations issued by defense mobilization agencies of the government, along with information on where various types of inquiries should be directed. Federal Register Div. of GSA's National Archives and Records Service, Washington 25, D.C., $6 per year.

MEETINGS...

Chem. Specialties Mfrs. Assn., annual meeting, Mayflower Hotel, Washington, D.C., December 2-4.

Amer. Inst. of Chem. Engrs., annual meeting, Chalfonte-Haddon Hall, Atlantic City, N.J., December 3-5.

Natl. Assn. of Mfrs., annual meeting, Waldorf-Astoria Hotel, New York, N.Y., December 5-7.

Soc. of Cosmetic Chemists, annual meeting, Biltmore Hotel, December 6.

Proprietary Assn., scientific section, Biltmore Hotel, New York, N.Y., December 7.

Synthetic Organic Chem. Mfrs. Assn., annual meeting, Commodore Hotel, New York, N.Y., December 11.

Compressed Air & Gas Inst., The Drake, Chicago, Ill., December 11-12.

Soc. of the Plastics Industry, Inc., conf., Commodore Hotel, December 13-14.

Natl. Constructors Assn., annual meeting Waldorf-Astoria Hotel, New York, N.Y., January 8-10, 1952.

A Dramatic Example of BARRETT'S EXPANSION

As defense production has been stepped up, the demand for Barrett* chemicals has grown tremendously.

Among the Barrett products eagerly sought is phthalic anhydride, vital to the production of alkyd resins, phthalate ester plasticizers, and many other important materials.

To meet this great demand, Barrett has taken two decisive steps that will substantially raise the output of phthalic anhydride.

First, the capacities of Barrett's Philadelphia and Ironton plants already have been increased. Second, Barrett is well under way in its plans to build two new plants in Chicago and Philadelphia. The one in Philadelphia alone will increase the production of phthalic anhydride by 36,000,000 pounds each year!

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* Reg. U. S. Pat. Off.

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ALLIED CHEMICAL & DYE CORPORATION
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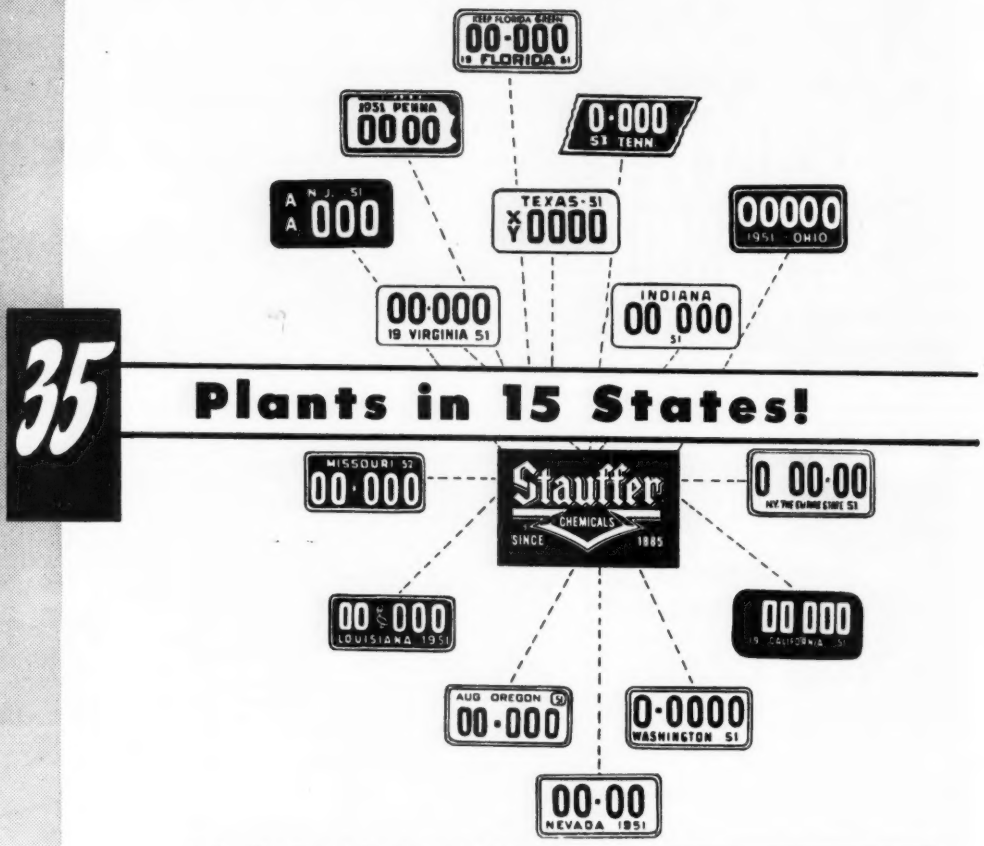

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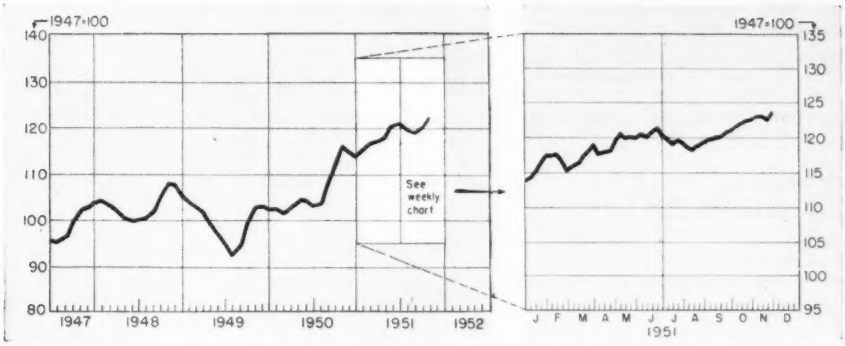

CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries

Industry knows the hard way that sulfur is short. Now the International Materials Conference in Washington has completed a survey of the global situation. The nub: Sulfur is just as scarce elsewhere as here.

Sulfur deficit for nations of the free world will be about the same in 1952 as in 1951—some 1.2-1.3 million long tons. Output in 1951 will be around 5.86 million tons; in 1952, 6.26 million tons. Needs will rise from 7.1 million to 7.6 million tons during this time, as IMC has it figured.

As the prime sulfur producer, the U.S. industry is overjoyed to find that many nations are switching to pyrites in making sulfuric acid. For the first time in a generation, more of the world's sulfuric acid will come from pyrites than from sulfur in 1952.

Despite these glad tidings, most U.S. chemical producers and processors are prepared for more belt-tightening on supplies of sulfur and its products. To ease the blow, sulfur consumers will rely on two measures; sulfur conservation and protection of their interests when the supplies are divided up.

The Rayon Yarn Industry Committee, for instance, is going around with the NPA on how much sulfuric acid and carbon bisulfide the industry should be allotted. NPA's offer: 90% of 1950 consumption, on a company-wide basis. But many on the committee believe this would be inadequate. Moreover, the industry feels that its output of high-tenacity tire yarn should get favored treatment by NPA at the expense of the less-essential civilian rayon goods.

This round-robin indicates the rayon industry expects to come back after the slow going of the last five months. For it doesn't, its need for carbon bisulfide won't even come up to the proposed allocation.

Manufacturers of pigments are asking OPS permission for higher prices to reflect recently increased prices of sodium tungstate, molybdenum, and lead. Some of these pigment raw materials have risen as much as 50% since last year. But the industry would like to maintain a uniform dollars-and-cents boost per pound, rather than using the thorny CPR-22. Reason: The recent permitted boosts in lead and zinc can't be passed along in the latter setup.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL INDUSTRIES Output Index (1947=100)	124.5	123.9	112.2
Bituminous coal production (daily average, 1000 tons)	1,850.0	1,900.0	1,974.0
Steel ingot production (thousand tons)	2,079.0	2,073.0	1,981.0
Wholesale prices—chemicals and allied products (1926=100)	140.0	140.2	135.8
Stock price index of 14 chemical companies (Standard & Poor's Corp.)	222.7	226.0	203.0
Chemical process industries construction awards (Eng. News-Record)	$9,887,000	$79,385,000	$14,368,000

MONTHLY BUSINESS INDICATORS—TRADE (Million Dollars)	MANUFACTURERS' SALES			MANUFACTURERS' INVENTORIES		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All Manufacturing	$20,847	$21,798	$20,101	$40,987	$40,576	$30,123
Chemicals and allied products	1,534	1,577	1,413	2,965	2,906	2,117
Paper and allied products	662	692	605	932	924	658
Petroleum and coal products	1,994	2,023	1,852	2,591	2,523	2,148
Textile products	1,103	1,164	1,188	3,145	3,190	2,202
Leather and products	253	315	308	636	622	510

It's a safe bet that NPA won't give the pigment industry any larger lead allotments. Normal needs of the industry are more than double the amounts available for allocation. To make matters worse, imports in 1951 will be less than half those of 1950.

Possible relief: The Munitions Board may dole out some from its stockpile.

Getting more tungsten or selenium will be worse than pulling teeth. Industry's share is about 50% under usual needs, and additional supplies are not on the way. Selenium output is limited, since it is only a tiny byproduct of copper refining.

Tungsten allotments for pigments are a mere 10 thousand pounds monthly, all for printing ink. And even though imports are slated to rise, the military has designs on all that comes in.

Chances of better supplies of antimony are bright since the OPS boosted the price ceiling of this metal by 8¢ lb. NPA has been pushing hard for higher production and imports, and the Defense Materials Procurement Agency briefed the industry this week on projected mobilization requirements for alloys and flameproofers.

Sodium bichromate supply has improved so much that there's almost enough to cope with demand. Before any further gains are made, two knots in the supply line must be unravelled: Transport of chromite from inland South African mines, and the lack of sulfuric for processing.

The Office of International Trade is clamping down harder on export controls even in cases where supplies are easier. Reason: to curb shipments (even of non-strategic nature) to Iron Curtain countries. OIT has now added nitrogenous fertilizers and copper sulfate to the positive list.

Current relaxed regulations on exported pesticides are due to be tightened before next spring, when U.S. agricultural needs can be estimated.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending November 26, 1951

	Change	New Price		Change	New Price
UP					
Antimony metal, c.l., mine	$ .08	$ .50			
DOWN					
Quicksilver, 76 lb. flask	$3.00	$215.00	Phenylethyl alcohol, dms.	$ .08	$1.67

All prices per lb. unless quantity is stated.

It's time we got *working* mad!

As we listen to the latest insults from Moscow, we're likely to get fighting mad.

Instead, we'd better use our heads and get *working* mad.

It is clear by now that Stalin and his gang respect just one thing—strength. Behind the Iron Curtain they've been building a huge fighting machine while we were reducing ours. Now we must rebuild our defenses—*fast.*

As things stand today, there is just *one* way to prevent World War III. That is to re-arm—to become strong—and to stay that way!

This calls for better productivity all along the line. Not just in making guns, tanks and planes, but in turning out civilian goods, too.

Arms must come first. But we must produce arms *at the same time* we produce civilian goods.

We can do this double job if we all work together to turn out more for every hour we work—if we use our ingenuity to step up productivity.

All of us must now make sacrifices for the common good. But we're working for the biggest reward of all —*peace with freedom!*

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Better Get It Now

Formaldehyde is now in better supply than at any time this year because of letdowns in textiles and plastics.

But military demand for hexamethylene tetramine and PETN, made from formaldehyde, will make the surplus vanish next year.

Shipping economies on solid formaldehyde will help widen markets when a new Texas plant comes in in the spring of 1952.

Anybody in the market for formaldehyde these days is likely, if he makes his wants known, to find himself wooed by salesmen of more than one producer. For the supply of this chemical is now freer than at any time this year.

As an inducement to the canny buyer, most formaldehyde producers have made price concessions since October. Du Pont whittled off about 3%, and this was matched by other majors like Solvay Sales and Heyden Chemical. All of them make their formaldehyde by oxidation of methanol.

Chief proponent of the hydrocarbon oxidation route is Celanese Corp. which stood pat, but its price is still slightly below that of most of the others. Since the softened demand has brought one some of these reductions, it is probable that a moderate hike is in the cards as needs rise. That is one possibility the should-I-buy-it-now customer keeps mulling over.

Why a Glut: The present slump, many figure, is the result of a combination of events that won't apply next year. Sales volume is climbing, but is still not far above the abnormally low levels of the past summer that followed earlier scare buying.

The textile business, and to a lesser extent, plastics, have been hit quite hard. And they are both big formaldehyde customers. Though plastics have picked up substantially since the summer lull, progress has been too slow for those accustomed to formaldehyde's spectacular growth. Another block: Shortage of phenol has curbed the heavy demand for phenol-formaldehyde resins.

Figuring out what's wrong with the textile market has the experts talking to themselves as well as to each other. But whatever it is, formaldehyde not used there is filling many a storage tank.

Comes the Pinch: Despite the current slack, demand is expected to pick up soon. The biggest single reason is the planned reactivation of the Cherokee Ordnance Works to make hexamethylene tetramine for military purposes.

FORMALDEHYDE: Supplies are long, but due to shorten.

Pentaerythritol, another formaldehyde product, is slated for manufacture of PETN (pentaerythritol tetranitrate), a huge explosive mainstay during World War II. And demand for pentaerythritol itself to make premium alkyd resins and to upgrade the cheaper drying oils is growing steadily.

Plastics, with new outlets sparked by acute metal shortages, are due for rapid expansion. Added production of phenol in 1952 will help take care of more formaldehyde. The dormant textile business, moreover, could hardly fail to improve within the next six months.

Time of Decision: One additional development—a trend to solid formaldehyde—will make a lasting mark on producers' plans. Celanese, for instance, is slated to convert much of its output to para-formaldehyde in the spring of next year. Advantages: savings on freight and storage, widening of markets. The upshot will be a bigger and more even demand.

Considering his own position in the light of these developments, each formaldehyde customer will have to decide when to start buying. But he isn't likely to find the supply next year as plentiful as it is now.

Every Bit Helps

Resin and plastics manufacturers may be breathing a bit easier soon since new production of phthalic anhydride and phthalic esters is on the way. The increase may total 3 million pounds (anhydride basis) in 1952, but it won't be from conventional sources.

Raw material for the phthalic is neither naphthalene nor ortho-xylene; it is the residuum from phthalic distillation. In the past, such a source might have seemed uneconomic, but present demands and prices spur its use.

Several manufacturers are readying production, and should hit full stride by next January. There's plenty of pitch available, however, and this may lure other processors in the field.

Dewey & Almy Chemical of Cambridge, Mass., biggest factor in this new field, does not plan to sell phthalic anhydride. Instead it will market dibutyl and dioctyl phthalate esters. The company has already begun limited operation, hopes to get up to capacity in January. Its equivalent anhydride output should be about 2.2 million pounds a year, for it intends to make 4 million pounds of the DOP and 1 million pounds of the butyl ester per year.

Getting the phthalic out of the pitch entails leaching, then dehydrating the resulting phthalic acid to the more salable anhydride.

Dewey & Almy reports a "completely new" process, but whether this entails new leaching methods, or a means of commercially producing the esters without going through the anhydride, is not clear.

D & A will price the non-captive portion of its ester production at current levels, and sees a market which will last past the current shortage. It has signed long-term contracts for its raw materials, which it says includes sources in addition to pitch residue.

One Good Year: A second prospect is By-Products Processing Labs, planing to make 400-500,000 pounds of anhydride next year in its Hackensack, N.J., facilities. Operations are scheduled to begin within 4 to 6 weeks.

The company, frankly terming its method a high-cost one, will charge approximately 50¢ per pound. Present manufacturers' prices for phthalic from either naphthalene or petroleum range around 20¢. Current resale quotations, reflecting the scarcity, are nearer the 45¢ level. At 50¢, however, By-Products sees a market for its product at least through 1952.

Third on the significant producer list is the Gulfport Vegetable Oil Co. of Gulfport, Miss. Its raw material is phthalic residue from Barrett's Ironton, Ohio, facilities.

Whether or not this number will grow depends on the economics of the process. By this time next year, when supply better balances demand, the answer should be clear.

GOVERNMENT AWARDS

Item	Supplier	Location
Aviation Supply Office, 700 Robbins Ave., Phila. 11, Pa.:		
Cleaning compound: engine-non-flammable	Turco Products, Inc.	Phila., Pa.
Thinner	George Senn, Inc.	Phila., Pa.
Pigment	The New Jersey Zinc Sales Co., Inc.	New York, N.Y.
"	Metalsalts Corp.	Hawthorne, N.J.
"	F. W. Berk & Co., Inc.	Wood Ridge, N.J.
Wax, floor	Trio Chem. Wks., Inc.	Brooklyn, N.Y.
U.S. Navy Purchasing Office, 1206 South Santee St., Los Angeles 15, Calif.:		
Charges, fire extinguisher	Natl. Foam System, Inc.	West Chester, Pa.
Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, O.:		
Chemicals, cl-10C	Eastman Kodak Co.	Rochester, N.Y.
New York Quartermaster Procurement Agency, 111 East 16th St., New York 3, N.Y.:		
Wood preservative, concentrates, pentachlorphenol, 55 gal. drum	Protective Coatings Corp.	Park Ridge, Ill.
Armed Services Medical Procurement Agency, 84 Sands St., Brooklyn 1, N.Y.:		
Tripelennamine, hydrochloride tablets	Ciba Pharmaceutical Products	Summit, N.J.
Chloramphenicol	Parke, Davis & Co.	Detroit, Mich.
Procaine, penicillin, G for aqueous inj.	Bristol Labs., Inc.	Syracuse, N.Y.
Procaine, penicillin, G for aqueous inj.	Abbott Labs.	N. Chicago, Ill.
Terramycin HCl capsules, for aqueous inj.	Chas Pfizer & Co.	Brooklyn, N.Y.
Antimony trichloride, bismuth subcarbonate	J. T. Baker Chem. Co.	Phillipsburg, N.J.

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Products and literature in this issue are listed on these pages. There are three indexes. (1) Editorial items on new products, new equipment, new literature; (2) products advertised. (3) The index of advertisers is on the following page.

THE NUMBERS

Advertisements:—There is a page number on the coupon for each advertisement. Before the number, may appear, L, R, T, B (left, right, top, bottom), locating the ad on the page; small letters following (a,b,c) indicate additional products in the advertisement.

Editorial Items:—Numerals are page numbers; the ABC's distinguish among items where more than one is on a page. There is a number on the coupon for each item referring to new products, equipment, and literature.

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For more data, circle number on coupon.

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Cation Exchangers 22A
Triallyl Cyanurate 24A

TECHNICAL LITERATURE

CHEMICALS

Petroleum Solvents 52A

EQUIPMENT

Air-Cushioned Vibrator 52E
Colorimeter 52G
Filter Papers 52F
Hardfacing Rod 52D
Jet Pumps 52C
Testing and Measuring Equipment .. 52B
Tin Metal 52H

PRODUCTS ADVERTISED

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Calculators, electronic 20

Chemicals

Allethrin 33
Anti-skinning agents T48f
Aromatic 22, T48a
Basic 44
Benzil 54a
Benzilic acid 54b
Benzoin 54c
Berez 32e
Bicarbonate of soda T42a
Butyl cellusolve stearate B38c
Butyl oleate B38b
Butyl stearate B38a
Caustic potash ..... Ib
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Expires March 1, 1952

BOOKLETS . . . .

Chemicals

Petroleum Solvents

8-p. technical catalog showing in tabular form results of tests taken to determine specifications and physical characteristics of the firm's line of industrial petroleum naphthas, petroleum solvents and hydrocarbons and petroleum paraffin hydrocarbons. A detailed chart indicates the applications of the various solvents in such fields as paints, varnishes, rubber cements and adhesives, textiles printing, waxes, brake linings, etc. American Mineral Spirits Co.

*Treated Fibers and Fabrics

Revised report written for textile manufacturers or processors to aid them in gaining close chemical control of their fungicide operations. Four methods are outlined here for determining the quantities of copper, zinc and mercury in treated fibers and fabrics — since the amount of metal deposited on the fabric indicates the efficiency of mildew-proofing processes involving fungicides which contain metals. Nuodex Products Co., Inc., Elizabeth F., N.J.

*Oils and Resins

Catalog supplying information on the firm's line of products including linseed oils, alkyd resins, fish and soya oils and specialty products. Detailed specifications chart is included. Falk & Co., P.O. Box 1075, Pittsburgh 30, Pa.

Equipment

Testing and Measuring Equipment

80-p. catalog summarizing the firm's testing and measuring equipment for laboratory and production line use. The catalog is intended primarily as a reference to the apparatus available for the complex measurements to be made in industry; thus each of the more than 130 products included is illustrated and briefly described as to uses, features, specifications and prices. General Electric Co.

Jet Pumps

20-p. bulletin supplying data on the capacities, operation, maintenance and uses of the various models of the company's jet pumps (ejectors, eductors, exhausters, syphons), devices which operate so as to induce fluids, vapor or gases into the suction chamber and discharge the mixture against pressure. Penberthy Injector Co.

Hardfacing Rod

Rod selection guide for applying hardfacing rods (Amscoating). Breaking down into basic operations the parts that should be hardfaced, this guide-chart notes the name of the part, the recommended rod, sizes, and method of application for each type of rod in the fields of agriculture, materials working, mining and excavating, crushing and pulverizing, materials handling, and power transmission. American Manganese Steel Div.

Air-Cushioned Vibrator

4-p. folder describes the operation, installation and uses of air-cushioned vibrator, air vibration equipment for moving, settling or packaging material quietly. The Cleveland Vibrator Co.

Filter Papers

36-p. catalog of analytical filter papers used in chemical analyses and biological procedures, describes the line of filter papers and accessories; also included is 12-page reference table for filtrations in methods of inorganic analysis; Government papers dealing with analytical filtering, testing methods, etc. are noted. Schleicher & Schuell Co.

Colorimeter

4-p. bulletin explaining oil color photometry of vegetable oils and fats by means of a photoelectric interference-filter colorimeter. Photovolt Corp.

Tin Metal

6-p. publication, "Sampling and Analysis of Tin Ingots," by J. W. Price is intended to aid chemists who wish to determine the actual amounts of each different impurity in refined ingots containing 99.75% of tin or over. Tin Research Institute, Inc.

* Request must be made to company on business letterhead.

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San Francisco 4 ..... Ralph E. Dorland, 68 Post St.

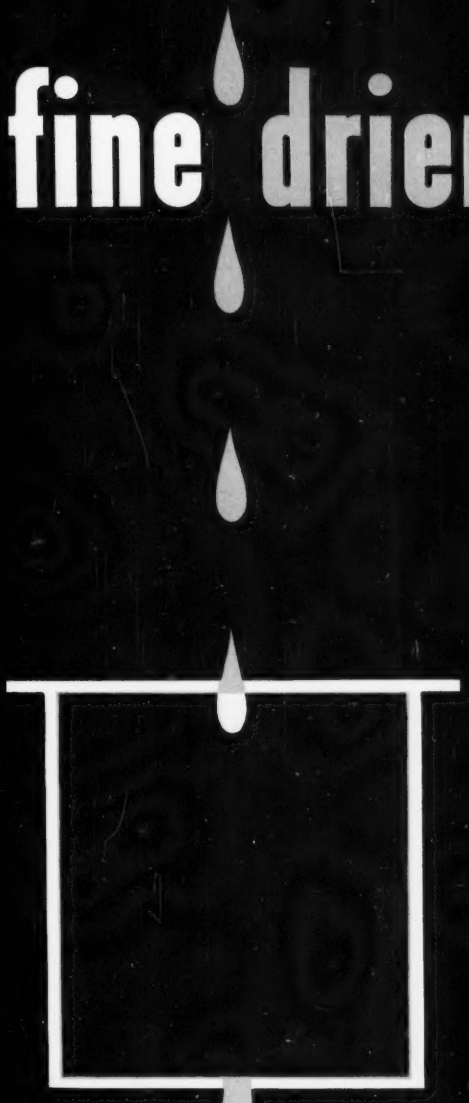
Boston 16 ..... 1427 Statler Bldg.

Detroit 26 ..... 856 Penobscot Bldg.

Pittsburgh 22 ..... 738 Oliver Bldg.

St. Louis 8 ..... 3615 Olive St., Continental Bldg.

fine driers



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to meet your every need, through
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One of these could be your STAR PERFORMER!

"Book" these versatile Heyden "performers" to put new spark into your "act". Our "booking agent" will supply samples and technical bulletins on request.

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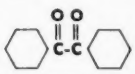
A versatile raw material, peculiarly reactive by virtue of the two adjacent carbonyl groups. Derivatives useful as dyes, insecticides, insect repellents, pharmaceuticals. Benzil is an effective chigger toxicant.

Meets U.S. Government Specification JAN-B-565

Availability: Commercial quantities
Containers: 100 Lb. fiber drums



MOL. WT. 210.22

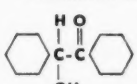
PROPERTIES

Appearance	light yellow powder
Congealing Point	94°C.
Boiling Point	346°-348°C. (d.)
Solubility	insoluble in water; soluble in alcohol and ether

BENZOIN

A highly reactive compound useful in the synthesis of a wide variety of products, including surface-active materials and stilbesterol derivatives. Derivatives are used in dyestuff, pharmaceutical, and plastics fields. Benzoin is a catalyst for the photopolymerization of vinyl compounds.

Availability: Commercial quantities
Containers: 100 Lb. fiber drums



MOL. WT. 212.24

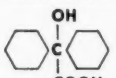
PROPERTIES

Appearance	light yellow crystals
Melting Range	131°-134°C.
Boiling Point	343°-344°C. (768 mm.)
Solubility	insoluble in water; soluble in alcohol and acetone; slightly soluble in ether

BENZILIC ACID

Useful Intermediate in the manufacture of mydriatics, spasmolytics, anti-histaminics, local anaesthetics, sedatives, and other pharmaceuticals.

Availability: Commercial quantities
Containers: 100 Lb. fiber drums



MOL. WT. 228.24

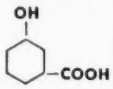
PROPERTIES

Appearance	light tan powder
Congealing Point	149°C.
Assay	99.5%
Solubility	soluble in hot water, alcohol and ether

META-HYDROXYBENZOIC ACID

Useful as an intermediate in the preparation of fine chemicals. Undergoes reactions typical of phenols and aromatic acids.

Availability: Experimental Quantities



PROPERTIES

Appearance	white powder
Melting Point	202°C.
Solubility	very slightly soluble in cold water; soluble in hot water and alcohol.

SERVING INDUSTRY THROUGH FINER CHEMICALS

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